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Influence of Grazing Management
on Vegetation and Wildlife Habitat

by

R. P. Gibbens and H. G. Fisser¹

Annual Report

of

Progress

July, 1969 - July, 1970

Cover Photograph: Both cattle and antelope utilize watering facilities installed to further better range use in a rest-rotation pasture.

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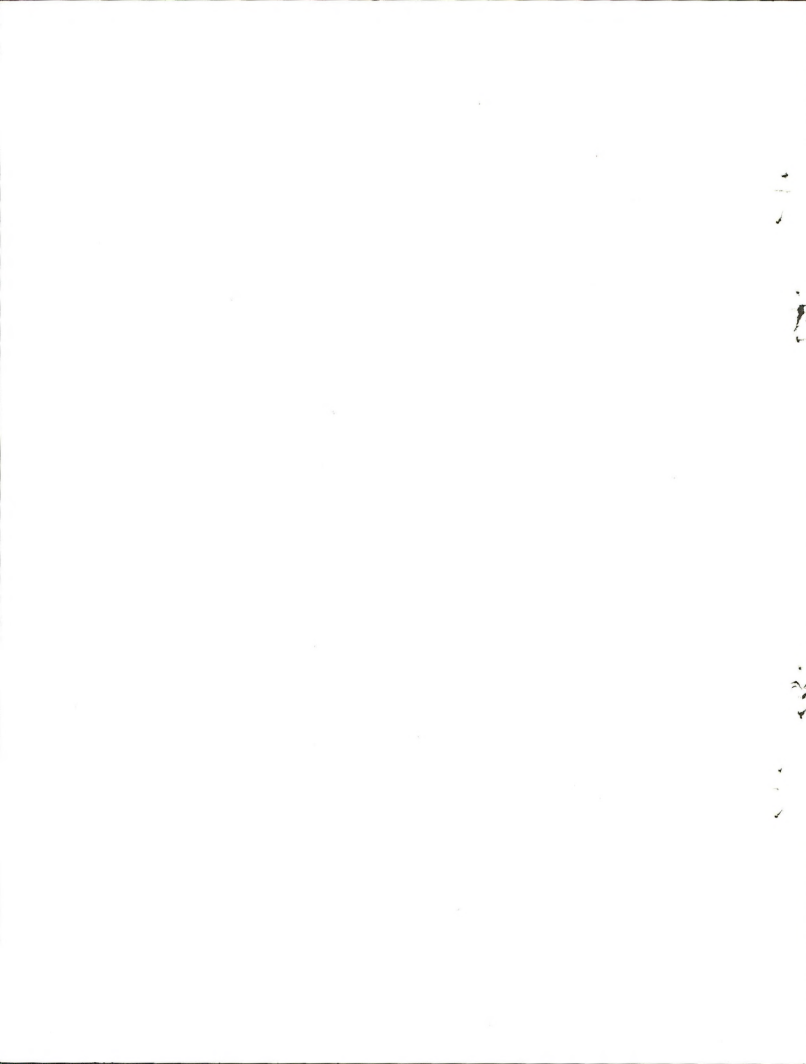
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Introduction

In 1967 the Wyoming Agricultural Experiment Station and the Bureau of Land Management initiated a cooperative program to study the influence of grazing systems upon vegetation and wildlife habitat. A 68,000 acre study site was selected west of Baggs, Wyoming. This site is divided into a four-pasture rest-rotation unit, a two-pasture rotation unit and a one-pasture unit with season long grazing. Acreages and grazing schedules are shown in Figure 1. A general description of the study site has been presented previously^{1/} as well as the locations of all study plots and exclosures^{2/}.

Methods and Procedures

Vegetative cover and composition determinations in 1969 were made only on those trend study transects which are paired with BLM trend plots. The same estimation and photographic procedures used in previous years were followed and these have been described elsewhere^{3/}.

Utilization of grasses and shrubs was determined by stem counts for western wheatgrass and by estimations for other species. Procedural details have been presented before^{2/}. Utilization of forage was determined at the end of the winter sheep grazing period and at the termination of cattle grazing periods.

^{1/} Gibbens, R. P., H. G. Fisser, and M. May. 1968. Grazing Systems Research - Annual Progress Report, 1967. Wyo. Agr. Exp. Sta. Sci. Report No. 102. 8 p.

^{2/} Gibbens, R. P., H. G. Fisser, and M. May. 1969. Grazing Systems Research - Annual Progress Report, 1968. Wyo. Agr. Exp. Sta. Sci. Report No. 179. 132 pp.

^{3/} Fisser, Herbert G. 1967. Exclosure study with transects of permanent plots - 1967 data. Wyo. Agr. Exp. Sta. Sci. Report No. 118. 52 pp.

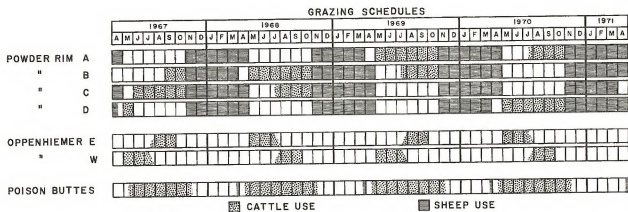
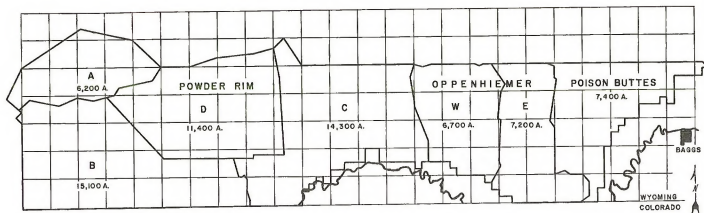
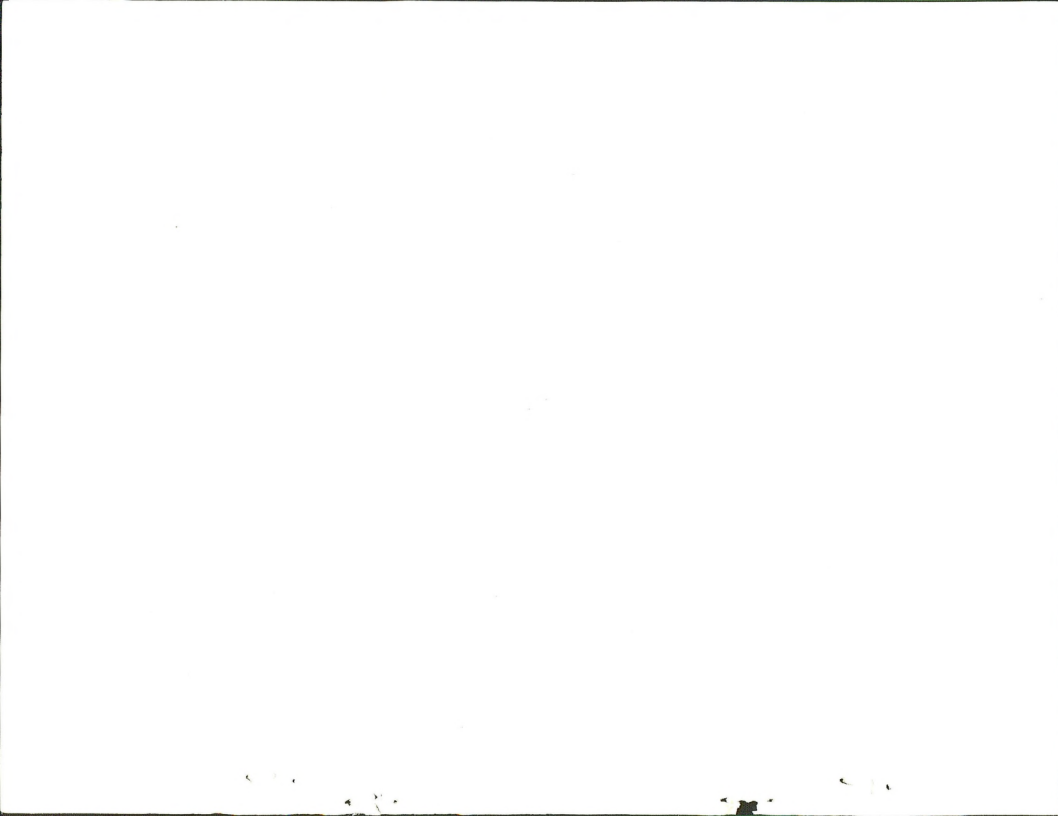


Figure 1. Map of the Baggs study area showing grazing units and approximate acreages. Grazing schedules for each unit are shown in the diagram below. The grazing schedule for the rest-rotation system in the Powder Rim allotment was adjusted to permit a more equitable distribution of forage among the operators. This change became effective on May 1, 1968 and grazing will follow the indicated pattern.



Vegetative Cover and Composition

Summaries of the vegetative cover and composition for each of the 21 trend transects sampled in 1969 are included in Appendix A. Species codes are given in Appendix B. Grass cover data from the 21 transects for 1967, 1968, and 1969 are presented in Table 1. The cover values for each year are mean values of 20 samples 1' x 1' and the identical areas were sampled each year. Since a three year period is very minimal for trend evaluation only the grass cover will be discussed. Shrub cover changed little during the three years and fluctuations in forb cover were largely due to greater or lesser abundance of annual forbs.

The change in total grass cover and western wheatgrass cover from 1967 to 1969, expressed as percent of the initial or 1967 value, was calculated (Table 1). Of the 21 sites, 17 showed an increase in total grass cover. On most sites this increase in total grass cover is directly related to an increase in western wheatgrass cover. Western wheatgrass increased on 15 of the 18 sites where it was present (Table 1). On the three sites where western wheatgrass was not represented Indian ricegrass made up most of the grass cover and it showed increases in cover ranging from 100 to 160 percent. Although annual grasses are included in the total grass cover they are not abundant on the sites in question and contributed little to grass cover changes.

The percent increase in grass cover as shown in Table 1 is quite large in several cases. However, the low values for total cover, ranging from less than one to slightly over five percent, should be kept in mind. With such small initial values a very small increase can appear large when expressed as a percentage. More important than magnitude of change in cover is the consistency of the increase on almost all of the sites. There is

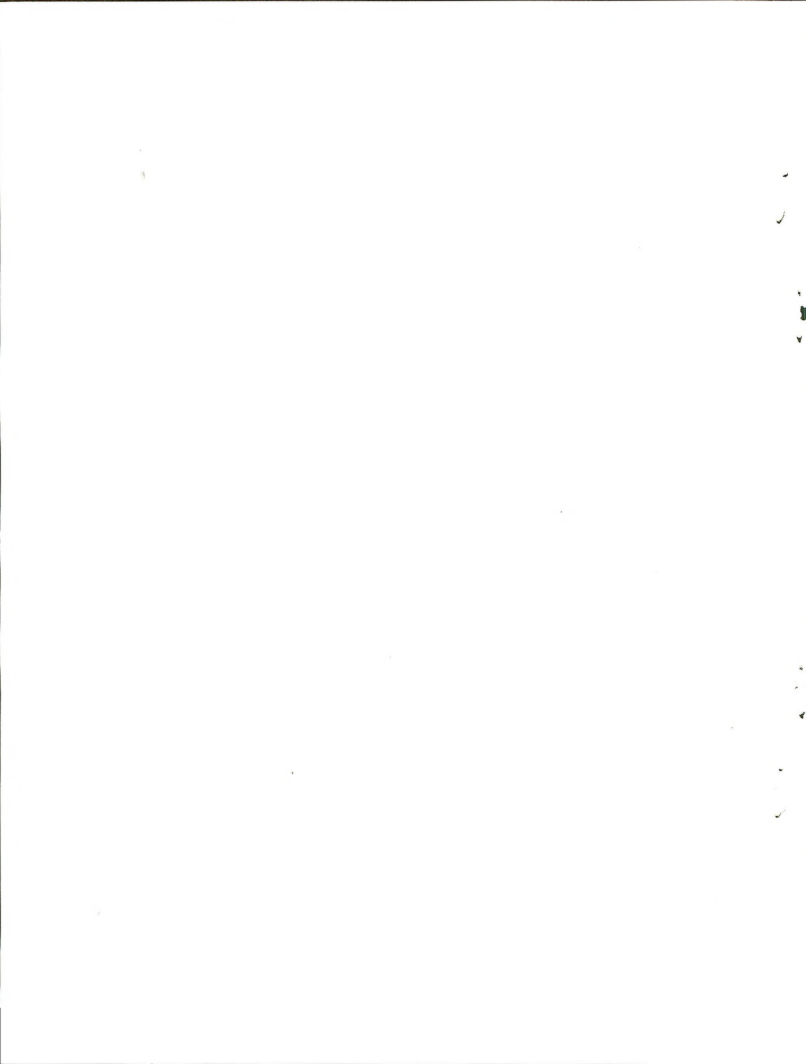
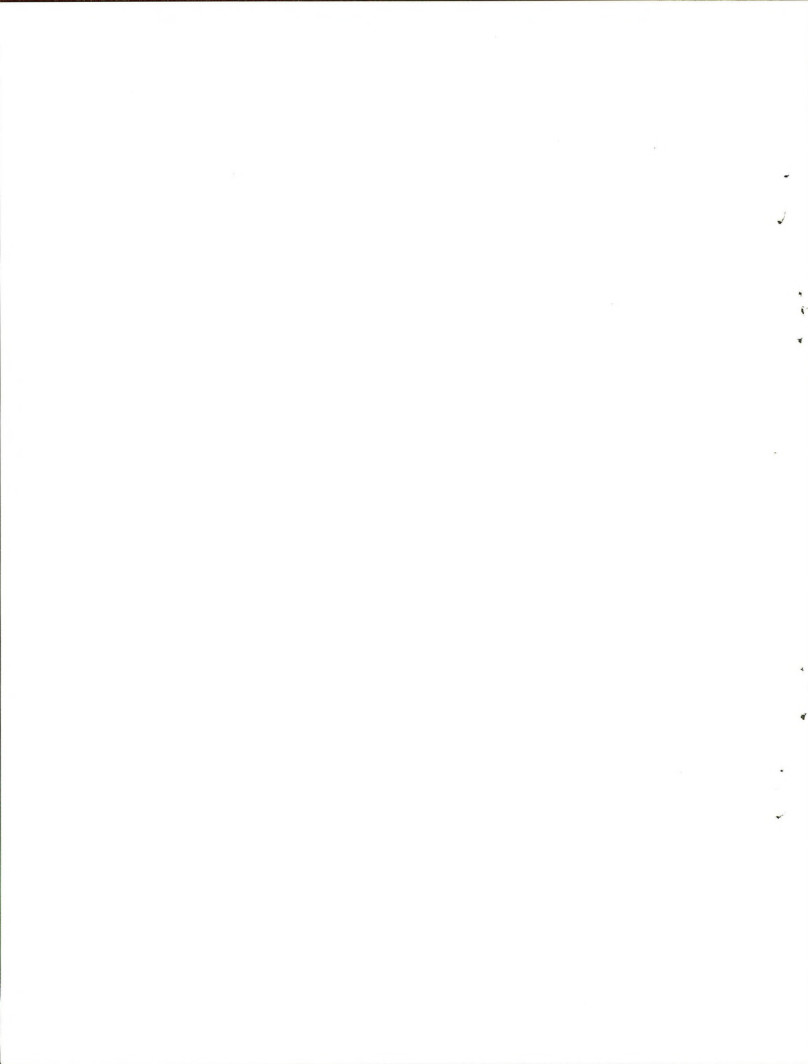


Table 1. Total grass cover, cover of western wheatgrass and the percent of change from 1967 to 1969 on trend transects paired with BLM trend plots. Cover values are means of 20 1' x 1' plots for each transect.

Pasture	Transect Number	BLM Plot Number	% Total Grass Cover				% Western wheatgrass Cover			
			1967	1968	1969	% Change	1967	1968	1969	% Change
Poison Buttes	C4-1	2	1.38	1.95	1.90	+38	0.89	1.36	1.43	+61
	C8-1	3	3.46	3.94	4.56	+32	2.18	2.78	3.33	+53
	C9-1	1	3.60	3.41	3.84	+ 7	1.34	1.86	2.36	+76
	C10-1	4	0.67	0.85	0.86	+28	0.26	0.38	0.49	+88
Oppenhiemer East	C2-1	3	0.49	0.56	0.55	+12	0.23	0.33	0.30	+30
	C5-1	2	1.63	1.57	2.30	+41	0.89	1.04	1.82	+105
Oppenhiemer West	C3-1	1	1.85	2.51	2.73	+48	1.26	1.91	2.20	+75
	C6-1	4	1.16	1.14	1.13	- 3	0.54	0.74	0.71	+31
Pasture A	C1-1	2	3.94	2.55	3.92	- 1	1.55	1.23	2.10	+35
	C5-1	1	1.13	1.44	1.42	+26	0.75	0.87	0.94	+25
Pasture B	C1-1	1	0.15	0.24	0.16	+ 7				
	C3-1	2	0.37	0.84	0.81	+119				
	C4-1	3	4.58	5.34	5.07	+11	0.15	0.19	0.22	+47
	C7-1	4	0.55	0.84	0.79	+44	0.04	0.05	0.11	+175
Pasture C	C1-1	1	0.98	0.89	0.66	-33	0.29	0.34	0.25	-14
	C2-1	2	0.46	0.22	0.25	-46	0.01			-100
	C2-2	2	0.84	1.19	1.27	+51	0.63	0.84	0.93	+48
Pasture D	C1-1	2	1.68	1.51	1.76	+ 5	0.82	0.61	0.76	- 7
	C4-1	4	0.08	0.14	0.13	+63	0.03	0.05	0.08	+167
	C5-1	1	1.89	2.20	2.52	+33	1.29	1.39	1.78	+38
	C10-1	3	0.71	0.78	0.72	+ 1				



no apparent correlation of increase in grass cover with any particular grazing treatment. Rather, an upward trend in perennial grass cover appears to be indicated on all of the treatments. Two consecutive years of relatively high precipitation is undoubtedly one factor contributing to the increased cover. Another contributing factor may be reduced stocking rates. Stocking rates were reduced at the initiation of the study and, at least in the four-pasture rest-rotation system, have been less than the allowed rate each year.

Precipitation and Vegetation Response

Precipitation records from the 17 rain gauges maintained on the study area are presented in Table 2. Even though measurements are made four times yearly a good picture of the temporal distribution of precipitation and its effect on plant growth is not obtained. The 12 April 1969 rainfall determinations show an average of 4.21 inches, compared to an average of 3.18 inches for the same period in 1968. The 30 June determinations were nearly the same in 1968 and 1969, being 2.87 and 2.80 inches, respectively. Thus, on the basis of total amounts of rainfall in the critical spring and early summer periods one could expect equal or slightly better vegetation growth in 1969 than in 1968. This was not the case. The late April, May and early June period in 1969 was extremely dry and effective rain did not fall until about 12 June. Thus, during the spring growth period there was only moisture stored in the soil from winter precipitation available to the plants. By contrast, 1968 had several effective rains during the comparable period.

The dry spring of 1969 was evident in the growth of both perennial and annual plants. Annual grasses, abundant in 1968, were conspicuous by

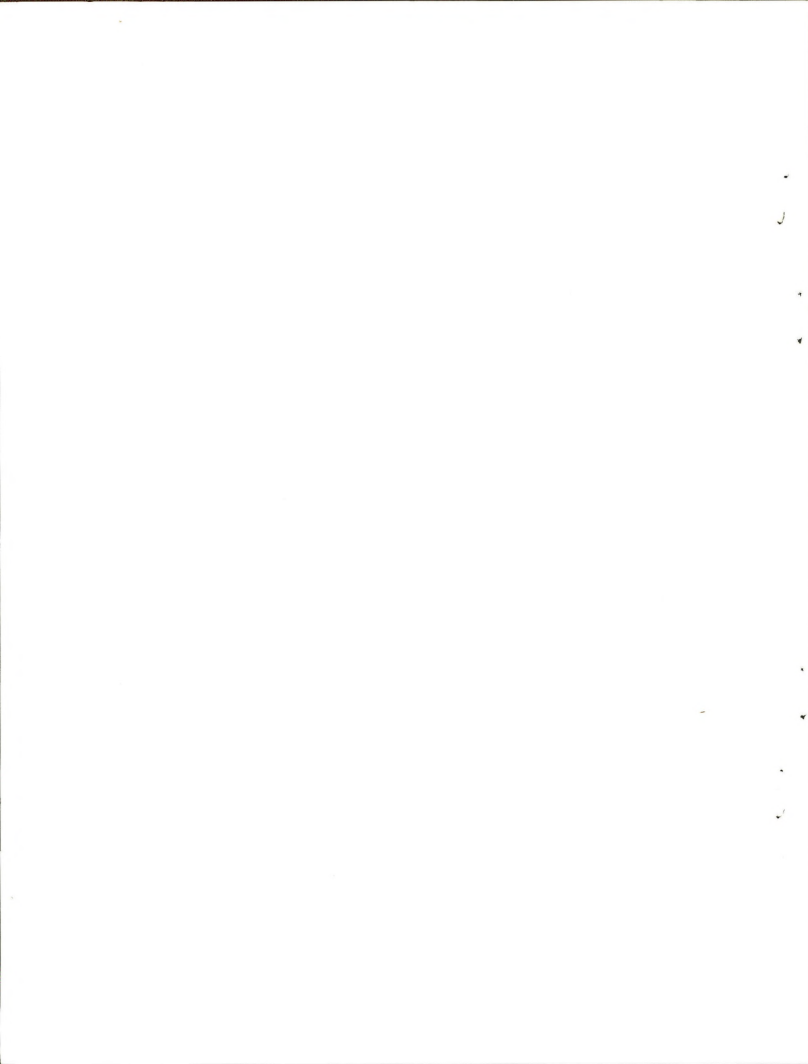


Table 2. Precipitation Records.

Rain Gauge Number	Location: Pasture or Pasture Junction	Total Oct. 1967	12 Apr.	30 June	1 Sept.	22 Oct.	Total Oct. 1968
		Oct. 1968	1969	1969	1969	1969	Oct. 1969
124	Poison Buttes Exc. I	10.69	5.24	3.18	1.43	2.14	11.99
125	Poison Buttes Exc. II	11.06	5.93	3.02	1.56	2.31	12.82
126	Poison Buttes-Opp. E	8.50	4.56	2.83	1.33	2.25	10.97
127	Oppenhiemer E-W	8.29	4.15	2.41	1.22	1.61	9.39
128	Oppenhiemer Exc.	9.17	4.74	2.88	1.04	2.20	10.86
129	Oppenhiemer W-C	7.43	3.93	2.50	0.87	1.78	9.08
130	Powder Rim C Exc.	7.04	4.21	2.40	0.91	1.45	8.97
131	Powder Rim D Exc.	6.90	3.92	2.55	0.72	1.56	8.75
132	Powder Rim D-C	7.11	4.10	2.96	1.20	1.70	9.96
133	Powder Rim D-C-B	6.29	3.18	2.88	1.16	1.51	8.73
134	Powder Rim B-D	6.87	2.85	2.78	1.65	1.57	8.85
135	Powder Rim B	8.91	4.07	3.45	1.74	1.97	11.23
136	Powder Rim B Exc. I	8.19	3.68	2.53	1.40	1.56	9.17
137	Powder Rim B Exc. II	10.75	5.20	2.92	2.35	2.47	12.94
138	Powder Rim A-B	9.05	3.92	3.11	2.79	2.30	12.12
139	Powder Rim A Exc. I	8.94	4.69	2.82	1.76	1.60	10.87
140	Powder Rim A	7.29	3.20	2.36	1.86	1.97	9.39
AVERAGE		8.38	4.21	2.80	1.47	1.88	10.36



their absence in 1969. Most of the few annuals present had matured and dried before the mid-June rains. Foliage production by perennial grasses appeared to be less affected by the spring drought than did seed production. Flower and seed production of both grasses and forbs in 1969 was only a small fraction of that of 1968.

Some patterns of precipitation distribution over the study area are becoming evident. It can be seen in Table 2 that the Poison Butte allotment usually receives more precipitation than the other allotments. This is perhaps due to the proximity of Poison Buttes to the mountains to the east and their orographic influence upon rainfall. The general pattern is for rainfall to fall off to a minimum at the north-west corner of Pasture A. However, the study area is so large that local summer storms can wet part of the area, or even part of a pasture, without providing precipitation elsewhere. This sometimes results in conspicuous local differences in growth of grasses and shrubs.

Seedling Establishment

In 1968 a tremendous crop of needleandthread grass seed was produced on the sprayed area in Pasture C. In order to see if there had been effective reproduction, 100 1' x 1' plots were examined along a paced transect on 23 June 1969. At that time there was an average of 4.9 needleandthread grass seedlings per sq. ft., or about 211,700 seedlings per acre. In addition, a few Indian ricegrass seedlings, equivalent to 6,970 per acre, were present. Few of the seedlings were dead when the counts were made



and these were included in the sample. In view of the dry spring previously mentioned the numbers of seedlings were surprisingly large.

On 30 August 1969 another 100 plots were examined along the same route previously used. An average of 2.8 needleandthread grass seedlings per sq. ft. were still living, or about 123,700 per acre. The loss between the two sampling dates was 41 percent for needleandthread grass and 75 percent for Indian ricegrass.

Naturally, a prerequisite for such a large crop of seedlings is a good stand of grass to produce the necessary seed and such a stand existed on the site in question. The data indicate that good seed crops of needleandthread grass can be followed by seedling establishment even when yearly precipitation patterns appear less than ideal. Even with further attrition of the seedling crop there should be enough survivors to cause a significant increase in the density of needleandthread grass on the site. It was a fortuitous coincidence that this pasture was not grazed by cattle in 1969, enhancing the probability of seedling survival.

While conditions were suitable for germination and establishment of needleandthread grass, there were few seedlings of other species. Many areas in all pastures were examined but few seedlings of either grasses or forbs were found. The sites of permanent line transects within the juniper type were looked over very carefully but not a single new seedling of true mountainmahogany or antelopebitterbrush was found and reproduction of other brush species was scanty.

Forage Utilization

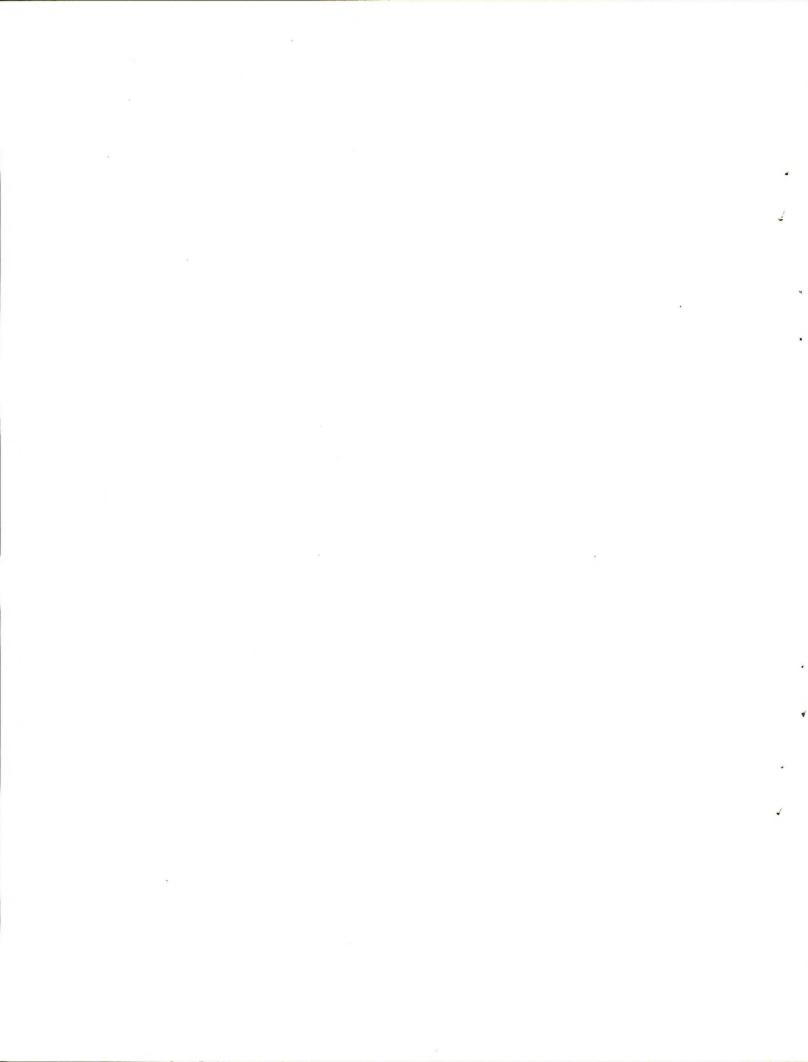
Following winter and early spring grazing by sheep, estimates were made of shrub utilization and the utilization of new growth of grasses.



Estimates made at each sampling site are presented in Table 1 of Appendix C. In general, sheep utilization in the four pastures of the rest-rotation unit was very spotty. Average utilization within pastures ranged from 6 to 17 percent for big sagebrush and from 44 to 67 percent for Nuttall salt-bush. Other shrub species were poorly represented at sampling sites and the few estimates obtained indicated very erratic use.

Late spring grazing by sheep was largely confined to pastures A, C and D. Pasture D appeared to have the most uniform spring use and average utilization of grasses was as follows: western wheatgrass, 11 percent; Indian ricegrass, 11 percent; Sandberg bluegrass, 11 percent; bottlebrush squirreltail, 14 percent; and prairie junegrass, 19 percent. The above figures and those presented in Table 1, Appendix C represent the use on new, green forage available at the time of sampling and are not to be construed as percentages relating to total production for a year. In view of the low average utilization it is doubtful if seasonal forage production on a pasture-wide basis is appreciably reduced by this early grazing, particularly in the pastures rested from cattle use for the remainder of the season. However, use during the critical early growth period does have the potential for reducing subsequent growth rates and total yield. The utilization figures indicate little species selectivity by the sheep; any species with green growth early in the spring is grazed.

Use of dry forage from the previous season by sheep was estimated as being light to moderate in all pastures. It is almost impossible to determine how much dry grass has been consumed and how much lost by breakage and normal weathering process.



Cattle utilization of western wheatgrass in 1969, as determined by the stem count method, is presented in Table 3. All of the cattle in the rest-rotation unit were confined to Pasture A for the first half of the season. Two utilization checks were made in this pasture, one on 28 July when part of the cattle were moved to Pasture B and another at the end of the season. It can be seen in Table 3 that most of the utilization of western wheatgrass occurred before 28 July. About 100 head of cattle remained in Pasture A during the last half of the season, accounting for approximately 13 percent additional use. Average utilization of bluebunch wheatgrass increased from 19 to 30 percent between 28 July and the end of the season. Throughout the season use in Pasture A was heaviest on the sprayed area where there is an excellent stand of bluebunch wheatgrass. Pasture A received no cattle use in 1967 or 1968; a period perhaps too long for optimum production of utilizable forage since many of the bluebunch wheatgrass plants accumulated old stems which tended to deter grazing.

Utilization of western wheatgrass was much more uniform in the Poison Buttes allotment than in previous seasons. In 1967 and 1968 use at the various sampling stations ranged from 2 to 98 percent and 0 to 91 percent, respectively. Better livestock distribution was maintained throughout the 1969 season and the range of utilization among sampling stations was 18 to 92 percent. The Oppenhiemer pastures have received relatively uniform grazing except in their northern sectors where water is often lacking. The rest-rotation pastures exhibit spotty utilization, believed to result primarily from poor water distribution. Even though water is poorly distributed the cattle do range to all parts of the



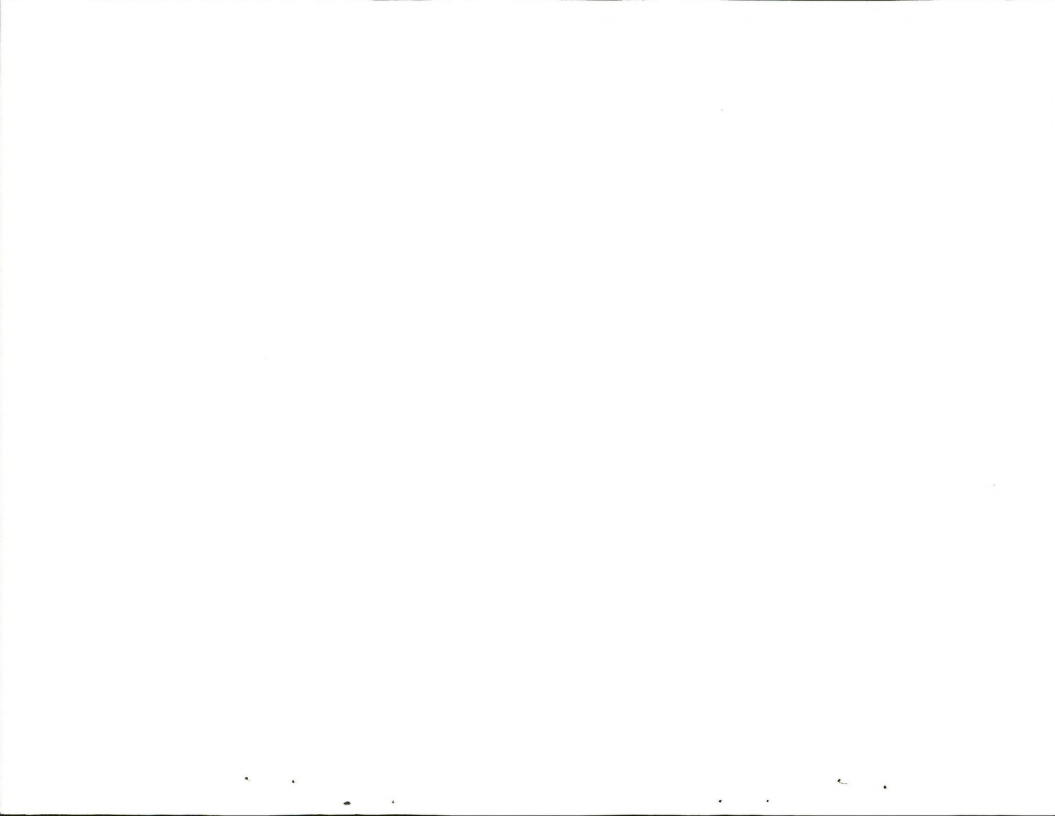
Table 3. Utilization of key forage species (Agsm) following summer grazing by cattle. Based on stem count method with counts made on 1' x 1' plots positioned along a permanent paced transect at each sampling site.

Pasture	Grazing Period	Date of Sampling	S a m p l i n g S i t e s											Exc.I	Avg. <u>1</u> /
			C1-1	C2-1	C3-1	C4-1	C5-1	C6-1	C7-1	C8-1	C9-1	C10-1			
Poison Buttes	15 Apr- 15 Nov	29 Nov 1969	32	53	41	48	66	18	86	92	64	36	86	65	
Oppenhiemer East	15 Jul- 30 Sep	23 Oct 1969	74	79	71	62	12	33	35	X	X	X	25	47	
Oppenhiemer West	1 May- 15 Jul +	29 Jul 1969	39	76	42	12	40	44	19	X	X	X	43	43	
Pasture A	1 May- 31 Oct	28 Jul 1969	76	81	63	52	52	20	83	X	X	X	65	63	
Pasture A	1 May- 31 Oct	23 Oct 1969	88	86	61	64	66	48	--	X	X	X	78	71	
Pasture B	15 Jul- 31 Oct	24-31 Oct 1969	--	4	11	34	17	21	74	48	9	31	77	31	

1/ Averages were calculated from total stems counted in each pasture and are not averages of the sampling site percent utilization figures.

X Site numbers not used.

-- No Agsm included in sample



pastures and there are no large, ungrazed areas. Major shifts in grazing patterns in response to temporary availability of water in reservoirs has been observed, particularly in Pasture B.

Estimates of cattle use of shrubs and grasses other than western wheatgrass are presented in Table 2 of Appendix C. As in past seasons, Indian ricegrass and needleandthread grass were grazed quite heavily, with use at some sampling sites amounting to 90 percent of current growth. Shrubs were used very little by cattle. Overall, utilization figures were very similar to those of previous years.

Cattle appear to exhibit an order of preference for the grasses available. Based on observations made during the past three seasons a tentative ranking in order of preference is as follows: Indian ricegrass, needleandthread grass, prairie junegrass, mutton bluegrass, western wheatgrass, and bluebunch wheatgrass. Such a ranking is, of course, subjective in nature since the ranked species do not occur on the same sites or in the same proportions.

It had been the impression while making utilization checks that there was perhaps a correlation between western wheatgrass density and percent use. Using 1969 data, correlation coefficients were calculated for the total number of stems within sq. ft. sample plots (N=330) and the percent of stems grazed in each plot (arcsin transformation of percent values performed). The correlation coefficients were not significant and in fact were very low, indicating that there is little or no correlation between stem density at a given location and the number of stems grazed.



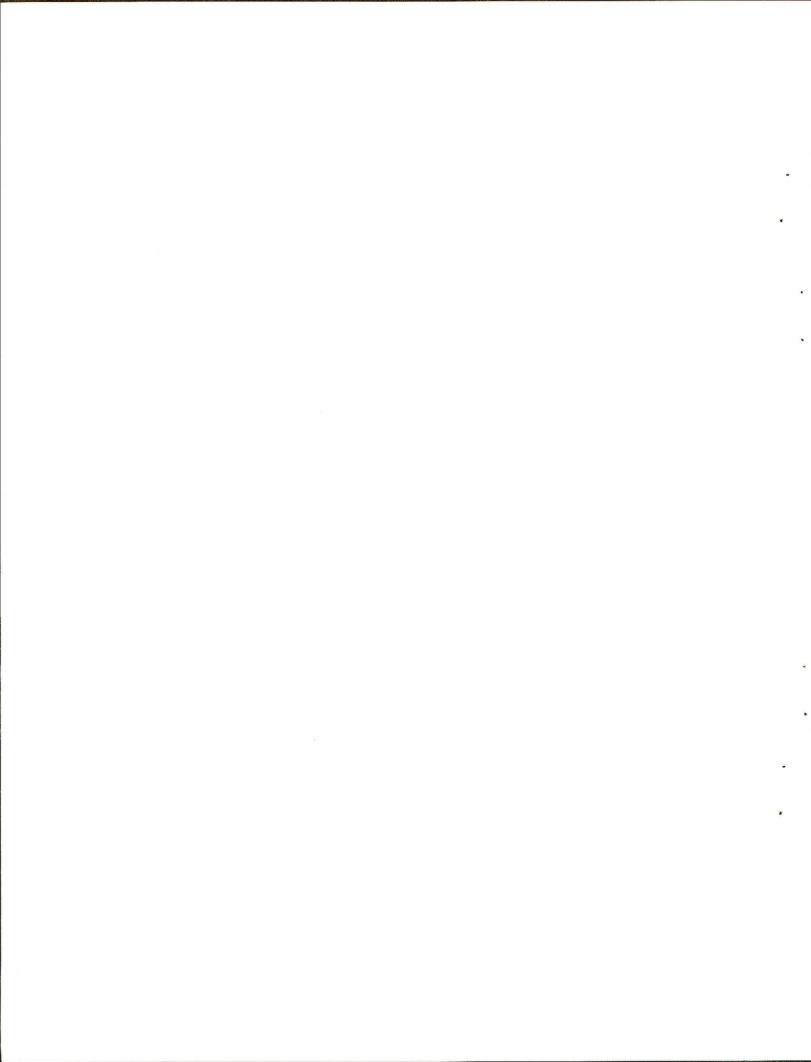
Wildlife Observations

Using accumulated notes taken on antelope numbers and distribution, a map of the rest-rotation pastures showing the areas frequented and the relative intensity of use was prepared (Figure 2). Also shown are the location and relative frequency of observations of antelope jumping fences. It appears that the antelope are becoming accustomed to the fences and adult animals cross the 32 inch fences at will. On occasion they have been observed jumping standard height 4-wire fences. Fawns, however, have never been observed to jump any fence unless cornered.

As shown in Figure 2, antelope concentrate in Pastures A, C, and D. However, the largest single group of antelope observed, over 50 animals, was seen in Pasture B in October of 1969. Presence or absence of cattle in the pastures apparently has no influence upon antelope distribution. The numbers seen in Pasture A during 1969 were equal to or greater than the numbers seen there in 1967 and 1968 when cattle did not use the pasture. The group of antelope in the Poison Buttes allotment increased from 6 to 11 animals. Some of these were observed in Oppenhiemer East pasture, an area not previously used by antelope.

Relatively large numbers of sagegrouse were observed during the summer of 1969. Broods were observed regularly in sprayed areas, particularly in Pasture A. A booming ground in the center of the sprayed area in Pasture C is still being used. Greatest concentrations of sagegrouse are found in Pastures A and C, few have been observed elsewhere.

Resident deer were seen in all pastures with most frequent sightings in Poison Buttes and the juniper-covered Little Snake River breaks in Pastures C and B. There are no indications of an increase in the resident



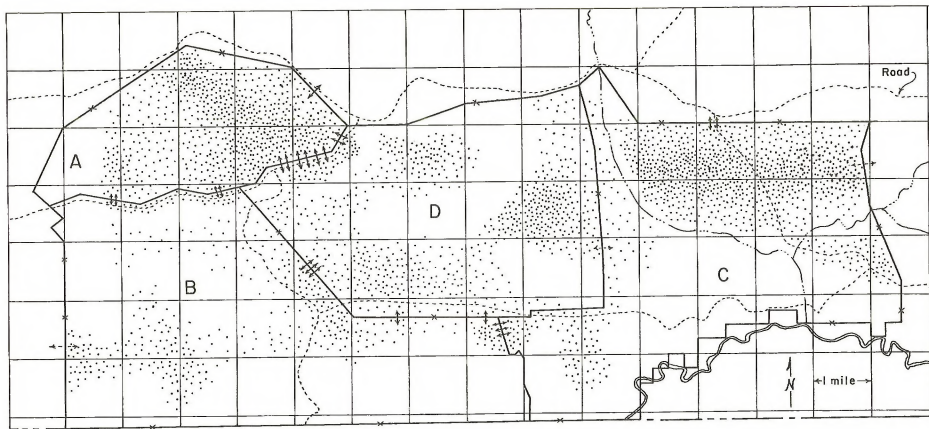
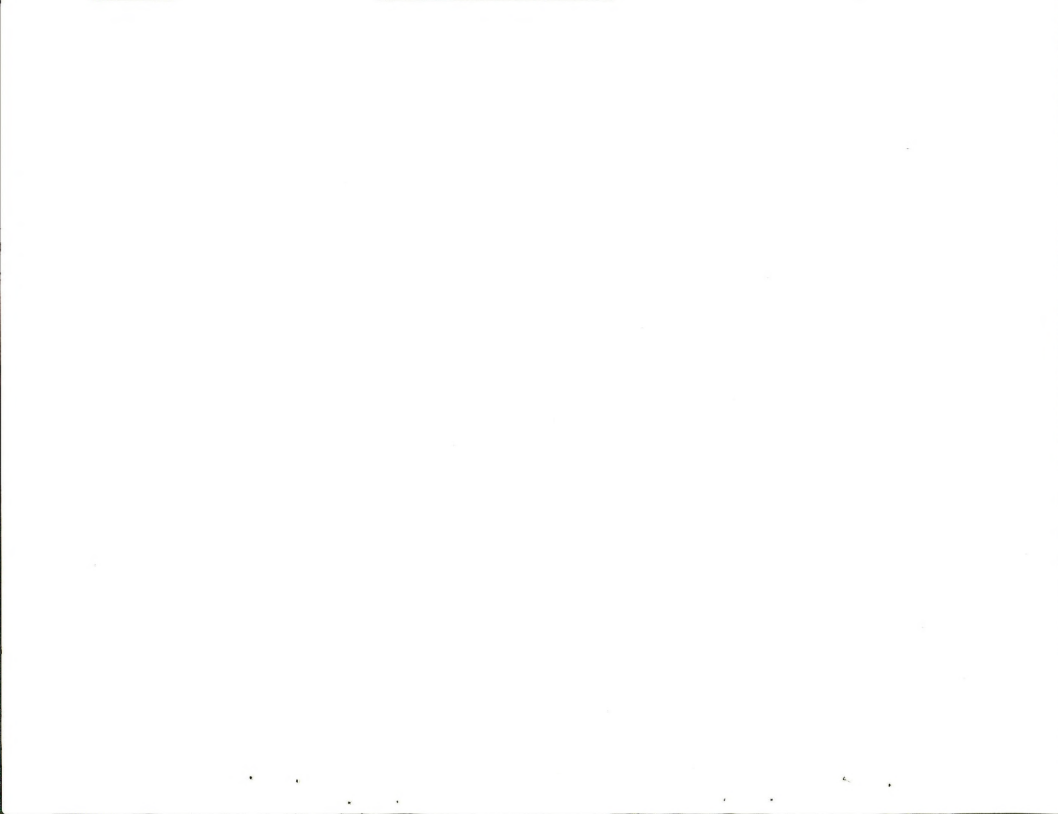
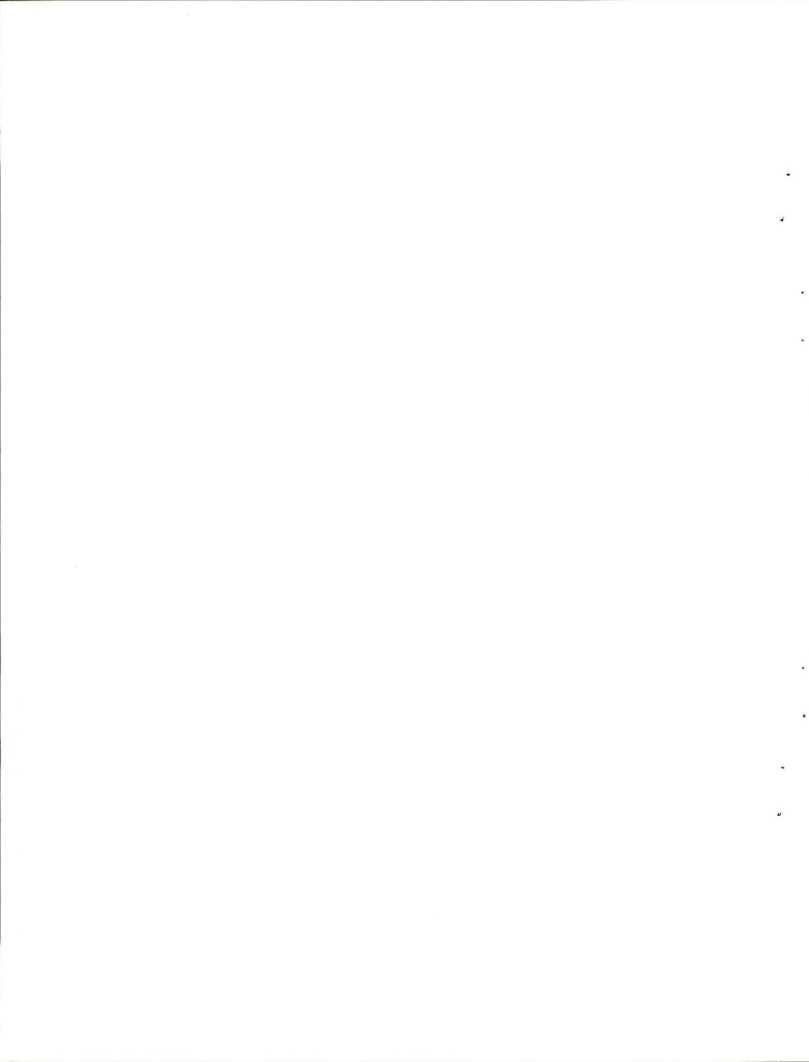


Figure 2. Distribution of antelope within rest-rotation pastures A, B, C and D of the Powder Rim Allotment. The intensity of stippling is proportional to the frequency of observation of antelope and so approximates the relative intensity of use in the different pastures. The number of arrows crossing pasture boundaries denotes the relative frequency with which antelope have been observed to jump fences. Dashed-line arrows indicate places of suspected frequent fence crossing.



population. Winter concentrations appeared to be similar to previous years. Deer utilization of true mountainmahogany ranged up to 90 percent of current growth in areas of heavy winter concentration.



POISON BUTTES ALLOTMENT

C8-1

Artr-Agsm Type - Sprayed

NE exp., 0.5° slope

Paired with BLM Plot No. 3

2 July 1969

C9-1

Artr-Agsm Type

N exp., 1° slope

Paired with BLM Plot No. 1

2 July 1969

	Cover %	Comp. % all G & F	Comp. % by Group	% Freq.		Cover %	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	Avg.				Artr	Avg.			
Artr	3.20			15	Artr	4.24			100
Shrub Total	3.20				Shrub Total	4.24			
Agsm	3.33	66.20	73.03	90	Agsm	2.36	53.87	61.45	100
Kocr	0.09	1.79	1.97	20	Kocr	0.14	3.20	3.65	25
Pofe	0.30	5.96	6.58	50	Orhy	0.05	1.14	1.30	5
Pose	0.48	9.54	10.53	100	Pofe	0.44	10.05	11.46	40
Sihi	0.23	4.57	5.04	45	Pose	0.43	9.82	11.20	90
Stco	0.13	2.58	2.85	15	Sihi	0.16	3.65	4.17	50
					Stco	0.26	5.94	6.77	35
Grass Total	4.56	90.64	100.00		Grass Total	3.84	87.67	100.00	
Alac	0.01	0.20	2.13	10	Alde	0.01	0.23	1.85	10
Alde	0.07	1.39	14.88	70	Andi	0.08	1.83	14.81	15
Andi	0.03	0.60	6.38	5	Copa	0.04	0.91	7.41	35
Asdr	0.01	0.20	2.13	5	Cora	0.04	0.91	7.41	35
Chat	0.01	0.20	2.13	10	Eren	0.05	1.14	9.26	50
Copa	0.01	0.20	2.13	5	Gisi	0.03	0.68	5.56	25
Cora	0.01	0.20	2.13	5	Gypa	0.01	0.23	1.85	10
Eren	0.01	0.20	2.13	10	Oppo	0.11	2.51	20.38	10
Gisi	0.04	0.80	8.51	35	Phho	0.02	0.46	3.70	15
Gypa	0.06	1.19	12.77	55	Phlo	0.01	0.23	1.85	10
Oean	0.07	1.39	14.89	65	Posa	0.08	1.83	14.81	75
Oppo	0.01	0.20	2.13	5	Trgy	0.05	1.14	9.26	45
Phlo	0.01	0.20	2.13	5	Unk.	0.01	0.23	1.85	5
Posa	0.10	1.99	21.27	100					
Trgy	0.02	0.40	4.26	20					
Forb Total	0.47	9.36	100.00		Forb Total	0.54	12.33	100.00	
G & F Total	5.03	100.00			G & F Total	4.38	100.00		



POISON BUTTES ALLOTMENT

C4-1

Artr-Agsm-Oppo Type
W exp., 3.5° slope
Paired with BLM Plot No. 2

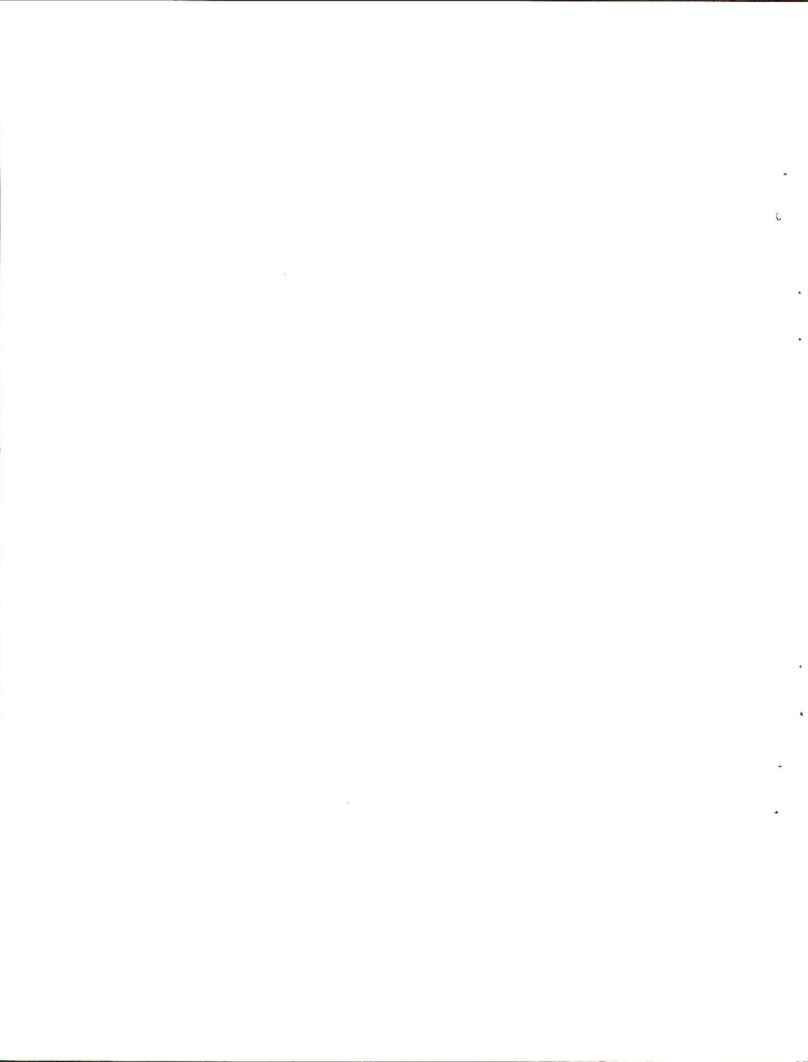
6 July 1969

C10-1

Artr-Agsm Type
SE exp., 3° slope
Paired with BLM Plot No. 4

6 July 1969

	Cover %	Comp. % all G & F	Comp. % by Group	% Freq.		Cover %	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	11.59			70	Artr	10.96			75
Shrub Total	11.59				Shrub Total	10.96			
Agsm	1.43	46.88	75.27	100	Agsm	0.49	40.15	56.98	40
Cael	0.01	0.33	0.53	5	Pose	0.29	23.77	33.72	40
Kocr	0.10	3.28	5.26	5	Sihy	0.08	6.56	9.30	30
Pofe	0.16	5.25	8.42	10					
Pose	0.13	4.26	6.84	70	Grass Total	0.86	70.48	100.00	
Sihy	0.02	0.66	1.05	15					
Stco	0.05	1.64	2.63	5	Alac	0.01	0.82	2.78	5
					Alde	0.09	7.38	25.00	85
Grass Total	1.90	62.30	100.00		Andi	0.01	0.82	2.78	5
					Crepis spp.	0.01	0.82	2.78	5
Alde	0.09	2.95	7.83	85	Eren	0.04	3.28	11.11	35
Andi	0.11	3.61	9.57	15	Maca	0.01	0.82	2.78	5
Crepis spp.	0.03	0.98	2.61	30	Oppo	0.10	8.20	27.76	10
Eren	0.02	0.66	1.74	15	Phho	0.01	0.82	2.78	10
Erov	0.03	0.98	2.61	10	Phlo	0.05	4.10	13.89	45
Oppo	0.73	23.93	63.46	40	Spco	0.01	0.82	2.78	5
Phho	0.02	0.66	1.74	20	Trgy	0.02	1.64	5.56	15
Phlo	0.03	0.98	2.61	30					
Spco	0.01	0.33	0.87	5	Forb Total	0.36	29.52	100.00	
Trgy	0.03	0.98	2.61	30					
Unk.	0.05	1.64	4.35	45	G & F Total	1.22	100.00		
Forb Total	1.15	37.70	100.00						
G & F Total	3.05	100.00							



OPPENHIEMER ALLOTMENT - EAST PASTURE

C2-1

Artr-Agsm Type
SW exp., 3⁰ slope
Paired with BLM Plot No. 3

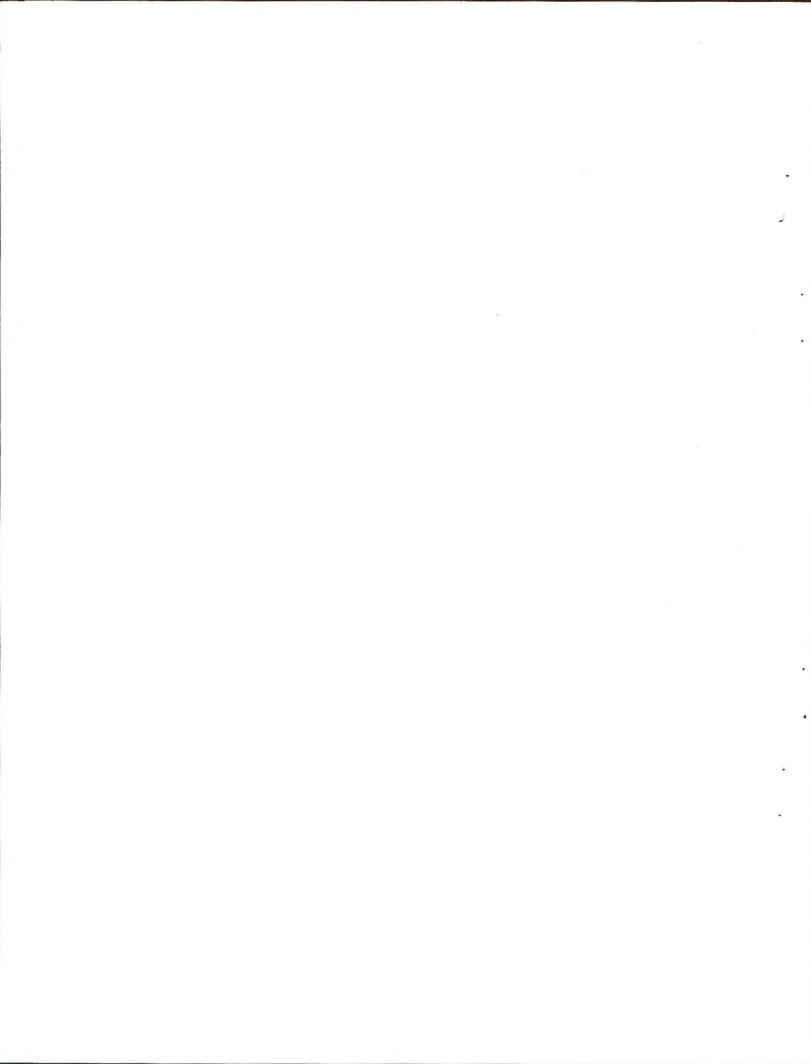
2 July 1969

C5-1

Artr-Agsm Type - Sprayed
NE exp., 0.5⁰ slope
Paired with BLM Plot No.2

2 July 1969

	Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.		Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	8.09			65	Artr	10.11			55
Shrub Total	8.09				Shrub Total	10.11			
Agsm	0.30	25.22	54.54	70	Agsm	1.82	70.01	79.13	95
Pose	0.21	17.65	38.18	80	Pofe	0.08	3.08	3.48	15
Sihy	0.02	1.68	3.64	15	Pose	0.30	11.54	13.04	80
Stco	0.01	0.84	1.82	5	Sihy	0.10	3.85	4.35	30
Brte	0.01	0.84	1.82	10					
Grass Total	0.55	46.23	100.00		Grass Total	2.30	88.48	100.00	
Alde	0.01	0.84	1.56	5	Alac	0.01	0.38	3.33	5
Andi	0.03	2.52	4.69	5	Alde	0.02	0.77	6.67	20
Arabis spp.	0.01	0.84	1.56	5	Cora	0.05	1.92	16.67	30
Eren	0.04	3.36	6.25	35	Crepis spp.	0.01	0.38	3.33	10
Erov	0.03	2.52	4.69	10	Eren	0.01	0.38	3.33	10
Haac	0.05	4.20	7.81	5	Lare	0.01	0.38	3.33	10
Lofo	0.02	1.68	3.13	15	Oppo	0.10	3.85	33.34	5
Oppo	0.28	23.53	43.74	10	Phho	0.01	0.38	3.33	10
Phho	0.07	5.88	10.94	45	Phlo	0.04	1.54	13.33	40
Phlo	0.05	4.20	7.81	45	Trgy	0.02	0.77	6.67	20
Spco	0.03	2.52	4.69	25	Unk.	0.02	0.77	6.67	15
Trgy	0.02	1.68	3.13	20					
Forb Total	0.64	53.77	100.00		Forb Total	0.30	11.52	100.00	
G & F Total	1.19	100.00			G & F Total	2.60	100.00		



OPPENHIEMER ALLOTMENT - WEST PASTURE

C3-1

Artr-Agsm Type - Sprayed
N Exp., 0.25° slope
Paired with BLM Plot No. 1

6 July 1969

C6-1

Artr-Agsm Type
N NE exp., 1° slope
Paired with BLM Plot No. 4

2 July 1969

	Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.		Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	1.24			40	Arsp	0.10			5
Shrub Total	1.24				Artr	9.16			60
Agsm	2.20	69.39	80.59	100	Atga	0.08			10
Orhy	0.10	3.15	3.66	5	Chvi	0.01			5
Pose	0.37	11.67	13.55	70	Shrub Total	9.35			
Stco	0.05	1.58	1.83	5	Agsm	0.71	42.80	62.84	60
Brte	0.01	0.32	0.37	5	Orhy	0.09	5.42	7.96	25
Grass Total	2.73	86.11	100.00		Pose	0.22	13.25	19.47	65
Alde	0.08	2.52	18.18	75	Sihy	0.11	6.63	9.73	25
Cora	0.02	0.63	4.55	20	Grass Total	1.13	68.10	100.00	
Eren	0.02	0.63	4.55	20	Andi	0.01	0.60	1.89	10
Lare	0.01	0.32	2.27	10	Arabis spp.	0.02	1.20	3.77	15
Oppo	0.23	7.26	52.27	15	Cora	0.03	1.81	5.66	30
Orfa	0.01	0.32	2.27	5	Crepis spp.	0.01	0.60	1.89	10
Phho	0.01	0.32	2.27	10	Eren	0.02	1.20	3.77	15
Phlo	0.04	1.26	9.09	35	Lare	0.01	0.60	1.89	5
Trgy	0.02	0.63	4.55	15	Lofo	0.01	0.60	1.89	5
Forb Total	0.44	13.89	100.00		Oppo	0.30	18.07	56.60	10
G & F Total	3.17	100.00			Phho	0.04	2.41	7.55	35
					Phlo	0.06	3.61	11.32	55
					Trgy	0.02	1.20	3.77	15
					Forb Total	0.53	31.90	100.00	
					G & F Total	1.66	100.00		



POWDER RIM ALLOTMENT - PASTURE A

C1-1

Artr-Agsm Type - Sprayed
NE exp., 2° slope
Paired with BLM Plot No. 2

30 June 1969

C5-1

Artr-Agsm Type
N NW exp., 2° slope
Paired with BLM Plot No. 1

29 June 1969

	Cover %	Comp. % all G & F	Comp. % by Group	% Freq.		Cover %	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	0.50			10	Artr	15.35			65
Shrub Total	0.50				Shrub Total	15.35			
Agsm	2.10	51.95	53.57	65	Agsm	0.94	55.94	66.20	90
Agsp	0.78	19.31	19.90	50	Orhy	0.25	14.88	17.61	15
Kocr	0.05	1.24	1.28	5	Pose	0.20	11.90	14.08	50
Orhy	0.25	6.19	6.38	25	Stco	0.03	1.79	2.11	5
Pofe	0.18	4.46	4.59	20					
Pose	0.24	5.94	6.12	60	Grass Total	1.42	84.51	100.00	
Siho	0.15	3.71	3.82	30					
Stco	0.17	4.21	4.34	40	Arabis spp.	0.01	0.60	3.85	10
					Cora	0.05	2.98	19.23	50
Grass Total	3.92	97.01	100.00		Erov	0.01	0.60	3.85	5
					Erpu	0.02	1.19	7.69	15
Cora	0.01	0.25	8.36	5	Haac	0.10	5.95	38.46	5
Eren	0.02	0.50	16.72	15	Phho	0.03	1.79	11.54	30
Ermi	0.01	0.25	8.36	5	Phlo	0.04	2.38	15.38	40
Lare	0.02	0.50	16.72	15					
Phlo	0.06	1.49	49.84	60	Forb Total	0.26	15.49	100.00	
Forb Total	0.12	2.99	100.00		G & F Total	1.68	100.00		
G & F Total	4.04	100.00							



POWDER RIM ALLOTMENT - PASTURE B

C1-1

C3-1

Atga Type

Chgr-Orhy Type

0 slope

NE exp., 1.75° slope

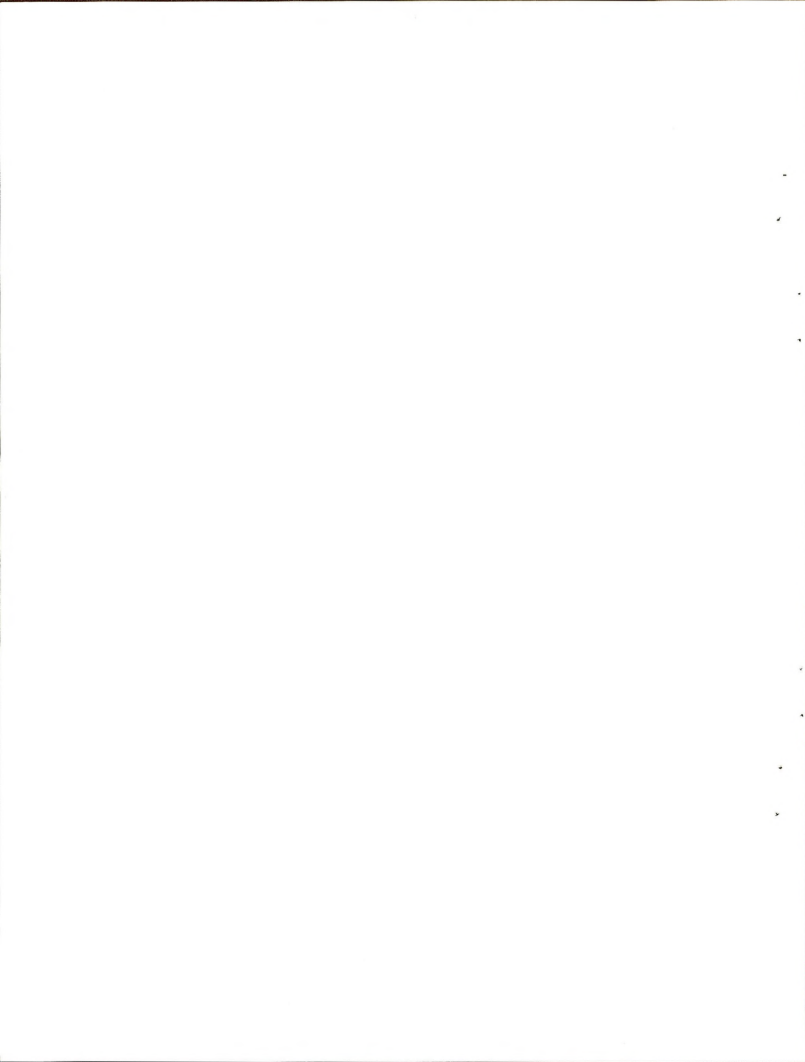
Paired with BLM Plot No. 1

Paired with BLM Plot No. 2

28 June 1969

28 June 1969

	Cover %	Comp. % all G & F	Comp. % by Group	% Freq.		Cover %	Comp. % all G & F	Comp. % by Group	% Freq.
Atga	12.08			90	Atga	0.20			5
Shrub Total	12.08				Chgr	2.83			85
Orhy	0.13	56.53	81.25	15	Koam	0.11			20
Sihy	0.03	13.04	18.75	10	Magl	1.00			60
Grass Total	0.16	69.57	100.00		Shrub Total	4.14			
Lare	0.07	30.43	100.00	70	Orhy	0.50	58.16	61.73	50
Forb Total	0.07	30.43	100.00		Pose	0.26	30.23	32.10	25
G & F Total	0.23	100.00			Sihy	0.05	5.81	6.17	30
					Grass Total	0.81	94.20	100.00	
					Lare	0.01	1.16	20.00	5
					Lofo	0.01	1.16	20.00	5
					Phho	0.01	1.16	20.00	5
					Saka	0.01	1.16	20.00	10
					Trgy	0.01	1.16	20.00	5
					Forb Total	0.05	5.80	100.00	
					G & F Total	0.86	100.00		



POWDER RIM ALLOTMENT - PASTURE B

C4-1

Artr-Cafi Type
S SW exp., 40° slope
Paired with BLM Plot No. 3

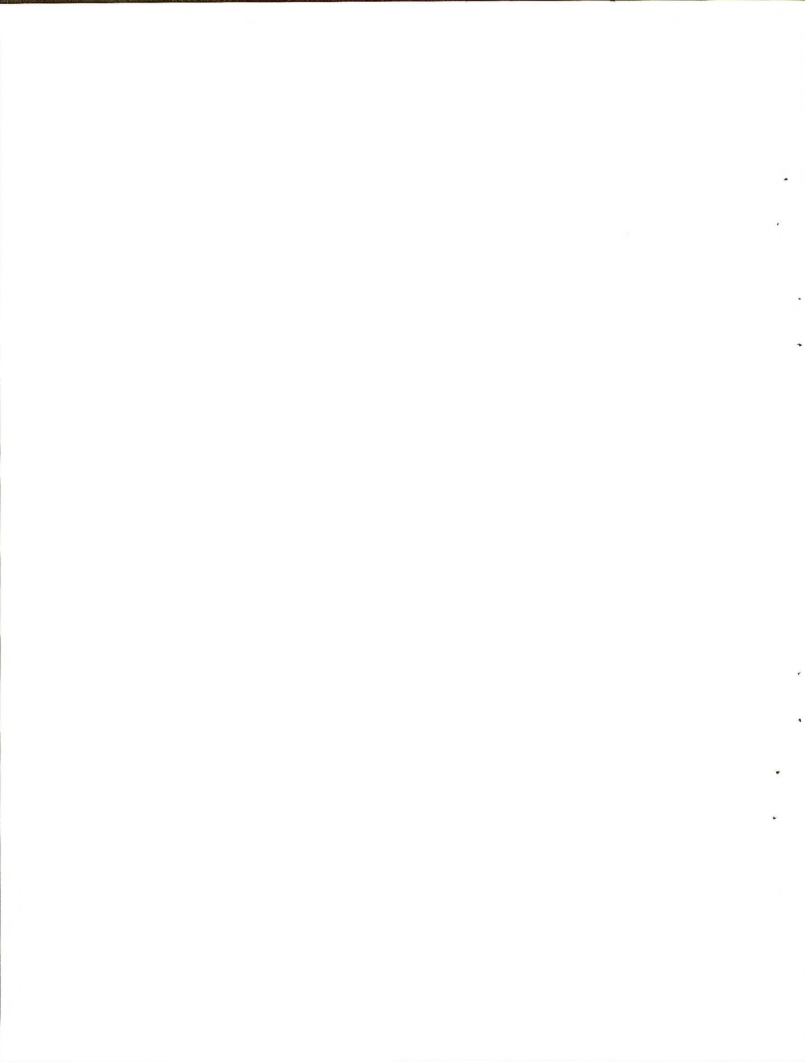
29 June 1969

C7-1

Arpe Type
W exp., 0.50° slope
Paired with BLM Plot No. 4

1 July 1969

	Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.		Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	4.93			20	Arpe	5.18			90
Shrub Total	4.93				Atga	0.17			25
					Chvi	3.04			80
Agsm	0.22	4.25	4.34	35	Shurb Total	8.39			
Cael	0.09	1.74	1.78	25					
Cafi	3.30	63.72	65.08	60	Agsm	0.11	11.11	13.92	10
Hija	0.23	4.44	4.54	15	Orhy	0.16	16.16	20.25	45
Pose	0.06	1.16	1.18	20	Pose	0.42	42.43	53.17	70
Stco	1.16	22.39	22.88	80	Sihy	0.10	10.10	12.66	55
Feoc	0.01	0.19	0.20	10					
Grass Total	5.07	97.89	100.00		Grass Total	0.79	79.80	100.00	
Alde	0.01	0.19	9.09	5	Cora	0.03	3.03	15.00	25
Aspu	0.01	0.19	9.09	5	Eren	0.03	3.03	15.00	30
Maca	0.01	0.19	9.09	5	Lare	0.01	1.01	5.00	5
Oeco	0.01	0.19	9.09	5	Pefr	0.01	1.01	5.00	10
Phho	0.01	0.19	9.09	10	Phho	0.10	10.10	50.00	95
Spco	0.05	0.97	45.46	25	Saka	0.01	1.01	5.00	5
Toin	0.01	0.19	9.09	10	Toin	0.01	1.01	5.00	10
Forb Total	0.11	2.11	100.00		Forb Total	0.20	20.20	100.00	
G & F Total	5.18	100.00			G & F Total	0.99	100.00		



POWDER RIM ALLOTMENT - PASTURE C

C1-1

Artr-Agsm Type
E NE exp., 1.5° slope
Paired with BLM Plot No. 1

1 July 1969

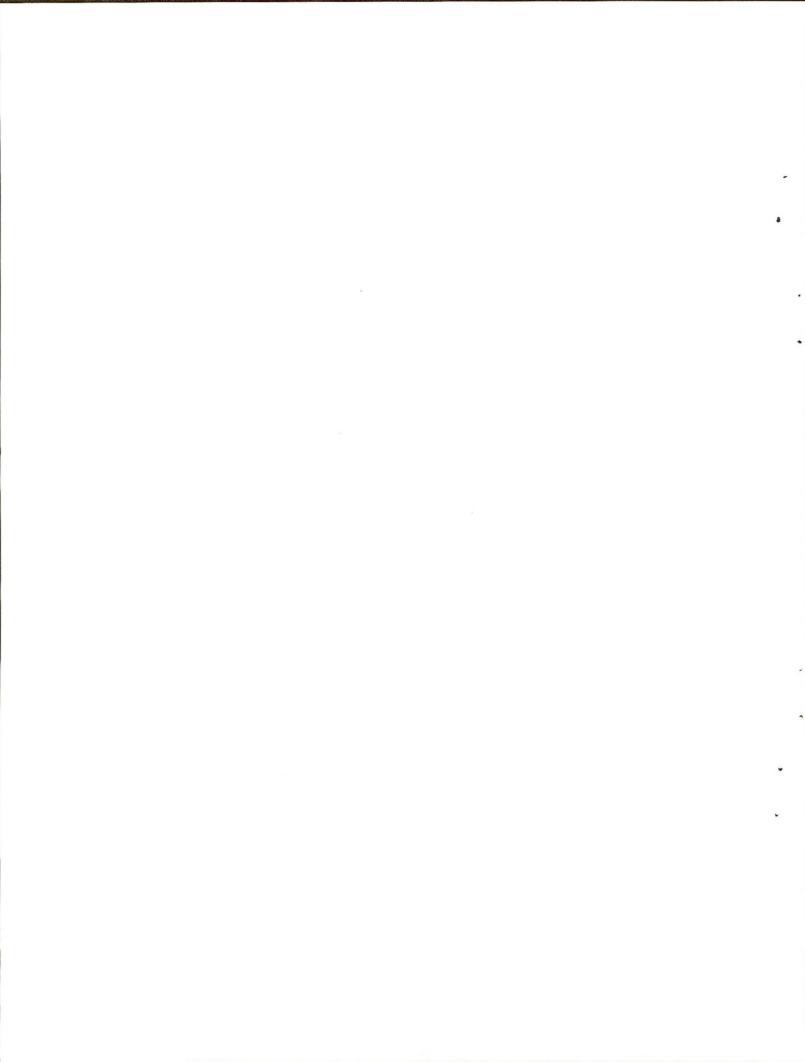
	Cover %	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	7.91			60
Chvi	0.11			10
Eula	0.01			5
Koam	0.03			5
Shrub Total	8.06			
Agsm	0.25	28.40	37.88	85
Orhy	0.20	22.73	30.30	50
Pose	0.14	15.91	21.21	55
Sihiy	0.07	7.95	10.61	25
Grass Total	0.66	74.99	100.00	
Andi	0.02	2.27	9.09	15
Arabis spp.	0.01	1.14	4.55	5
Cora	0.03	3.41	13.64	30
Crepis spp.	0.01	1.14	4.55	10
Eren	0.04	4.55	18.18	35
Gisi	0.01	1.14	4.55	10
Pefr	0.01	1.14	4.55	10
Phho	0.05	5.68	22.71	45
Phlo	0.02	2.27	9.09	15
Trgy	0.02	2.27	9.09	15
Forb Total	0.22	25.01	100.00	
G & F Total	0.88	100.00		

C2-1

Artr-Agsm Type
S SW exp., 2° slope
Paired with BLM Plot No. 2

1 July 1969

	Cover %	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	11.96			85
Atco	0.03			10
Atga	0.60			20
Chvi	0.10			5
Grsp	0.01			5
Shrub Total	12.70			
Orhy	0.13	26.55	52.00	10
Pose	0.01	2.04	4.00	5
Sihiy	0.02	4.08	8.00	15
Brte	0.06	12.24	24.00	55
Feoc	0.03	6.12	12.00	25
Grass Total	0.25	51.03	100.00	
Arabis spp.	0.01	2.04	4.17	10
Erce	0.03	6.12	12.50	25
Eren	0.04	8.16	16.67	35
Erov	0.11	22.45	45.82	10
Gisi	0.02	4.08	8.33	15
Lepu	0.01	2.04	4.17	5
Oeco	0.01	2.04	4.17	10
Phho	0.01	2.04	4.17	5
Forb Total	0.24	48.97	100.00	
G & F Total	0.49	100.00		



POWDER RIM ALLOTMENT - PASTURE C

C2-2

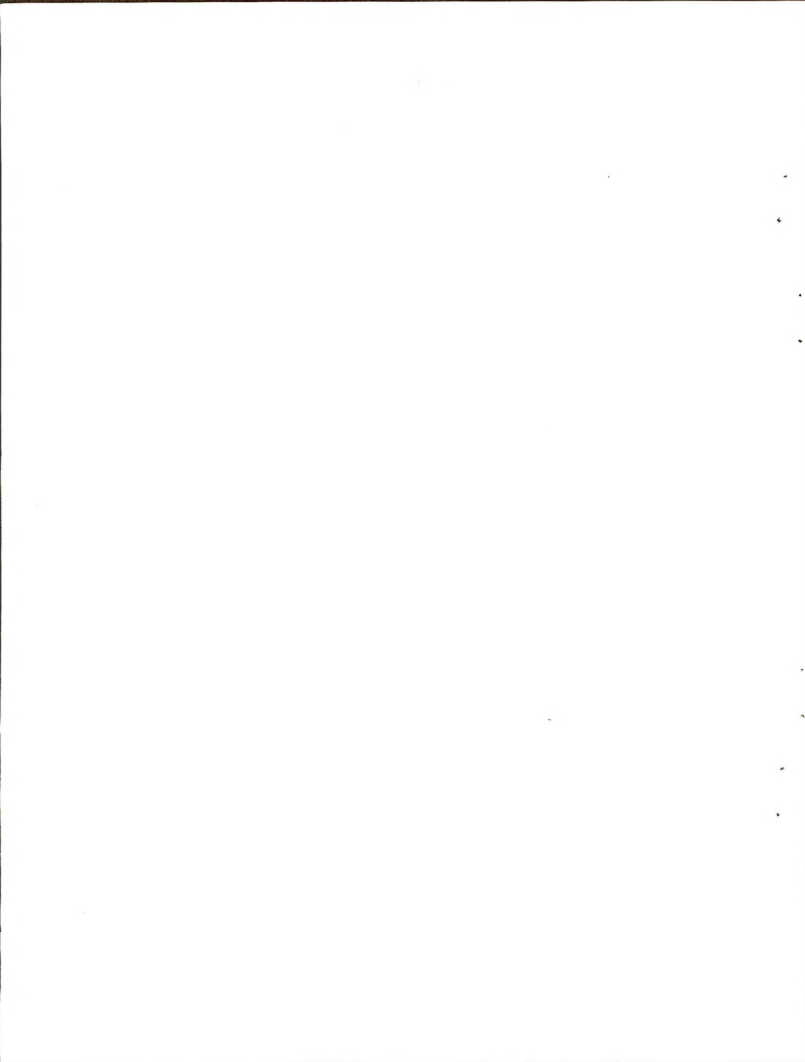
Artr-Agsm Type

S SW exp., 2.5° slope

Paired with BLM Plot No. 2

1 July 1969

	Cover %	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	8.25			85
Atco	0.21			25
Atga	0.50			5
Chvi	0.18			10
Shrub Total	9.14			
Agsm	0.93	58.88	73.25	55
Orhy	0.11	6.96	8.66	15
Pose	0.01	0.63	0.78	5
Sihy	0.11	6.96	8.66	40
Stco	0.06	3.80	4.72	10
Brte	0.01	0.63	0.78	5
Feoc	0.04	2.53	3.15	40
Grass Total	1.27	80.39	100.00	
Alde	0.02	1.27	6.45	20
Eren	0.02	1.27	6.45	20
Erov	0.05	3.16	16.13	5
Gisi	0.04	2.53	12.90	40
Lare	0.01	0.63	3.23	5
Lupu	0.01	0.63	3.23	5
Oeco	0.01	0.63	3.23	10
Oppo	0.15	9.49	48.38	10
Forb Total	0.31	19.61	100.00	
G & F Total	1.58	100.00		



POWDER RIM ALLOTMENT - PASTURE D

C1-1

C4-1

Artr-Eula-Agsm Type

Save-Arsp Type

E exp., 3° slope

E exp., 0.25° slope

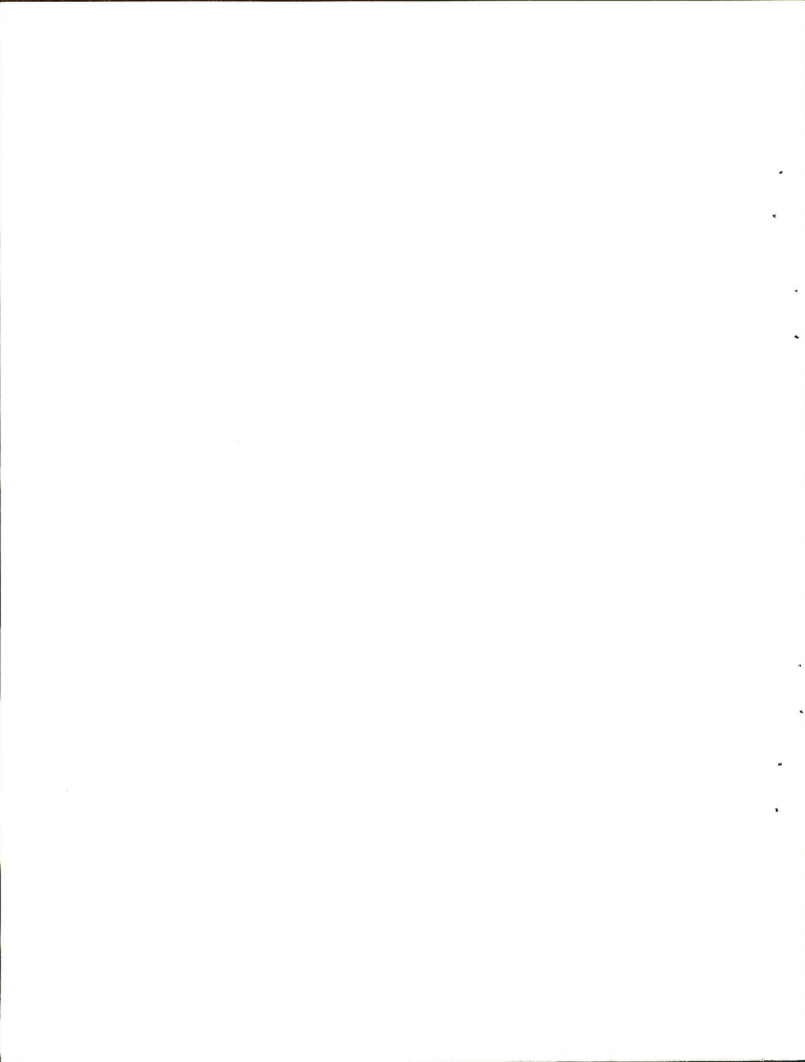
Paired with BLM Plot No. 2

Paired with BLM Plot No. 4

1 July 1969

1 July 1969

	Cover %	Comp. % all	Comp. % by	%		Cover %	Comp. % all	Comp. % by	%
	Avg.	G & F	Group	Freq.		Avg.	G & F	Group	Freq.
Artr	1.80			15	Arfr	0.51			25
Atga	0.10			5	Arsr	0.36			55
Chvi	0.03			10	Atga	0.79			20
Eula	1.12			45	Chvi	0.25			5
					Koam	0.43			70
Shrub Total	3.05				Save	0.20			10
Agsm	0.76	38.36	43.17	85	Shrub Total	2.54			
Kocr	0.01	0.51	0.57	5	Agsm	0.08	7.27	61.54	5
Orhy	0.73	36.85	41.48	85	Pose	0.04	3.64	30.77	20
Pose	0.24	12.12	13.64	65	Sihi	0.01	0.91	7.69	5
Sihi	0.02	1.01	1.14	20					
Grass Total	1.76	88.85	100.00		Grass Total	0.13	11.82	100.00	
Alde	0.01	0.51	4.55	5	Alde	0.03	2.73	3.09	25
Chde	0.04	2.02	18.18	35	Atwo	0.13	11.82	13.40	65
Cora	0.01	0.51	4.55	5	Lare	0.01	0.91	1.03	5
Erce	0.01	0.51	4.55	5	Oppo	0.80	72.72	82.48	20
Eren	0.01	0.51	4.55	10					
Gipu	0.03	1.52	13.64	25	Forb Total	0.97	88.18	100.00	
Lare	0.02	1.01	9.09	15					
Oppo	0.01	0.51	4.55	5	G & F Total	1.10	100.00		
Phho	0.06	3.03	27.24	60					
Maca	0.01	0.51	4.55	5					
Unk.	0.01	0.51	4.55	5					
Forb Total	0.22	11.15	100.00						
G & F Total	1.98	100.00							



POWDER RIM ALLOTMENT - PASTURE D

C5-1

C10-1

Artr-Agsm Type

Atco Type

0 slope

NE exp., 2° slope

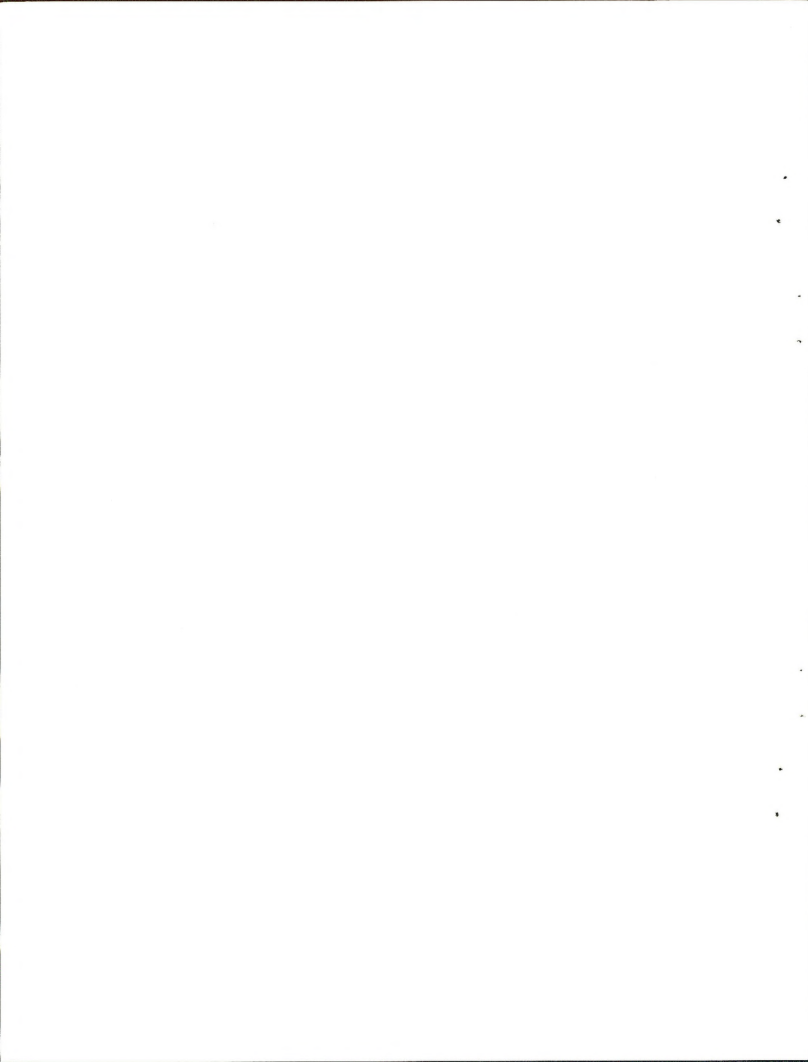
Paired with BLM Plot No. 1

Paired with BLM Plot No. 3

30 June 1969

1 July 1969

	Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.		Cover % Avg.	Comp. % all G & F	Comp. % by Group	% Freq.
Artr	14.74			70	Atco	3.07			40
Atco	0.85			15	Chvi	0.01			5
					Eula	0.91			40
Shrub Total	15.59				Shrub Total	3.99			
Agsm	1.78	65.93	70.63	80	Orhy	0.16	15.84	22.22	30
Orhy	0.36	13.33	14.29	15	Pose	0.23	22.77	31.94	55
Pose	0.24	8.89	9.52	55	Sihy	0.03	2.97	4.17	5
Sihy	0.14	5.19	5.56	60	Stco	0.25	24.76	34.72	45
Grass Total	2.52	93.34	100.00		Brte	0.04	3.96	5.56	40
Aspu	0.01	0.37	5.56	5	Feoc	0.01	0.99	1.39	5
Cora	0.04	1.48	22.22	40	Grass Total	0.72	71.29	100.00	
Phho	0.08	2.96	44.44	60	Alde	0.06	5.94	20.68	60
Phlo	0.04	1.48	22.22	20	Atar	0.01	0.99	3.45	5
Sili	0.01	0.37	5.56	5	Chat	0.03	2.97	10.34	25
Forb Total	0.18	6.66	100.00		Erce	0.01	0.99	3.45	10
G & F Total	2.70	100.00			Eren	0.02	1.98	6.90	15
					Erov	0.02	1.98	6.90	15
					Gipu	0.05	4.95	17.24	50
					Lare	0.01	0.99	3.45	5
					Maca	0.01	0.99	3.45	5
					Plpa	0.02	1.98	6.90	15
					Saka	0.05	4.95	17.24	30
					Forb Total	0.29	28.71	100.00	
					G & F Total	1.01	100.00		



PLANT SPECIES CODES

Appendix B

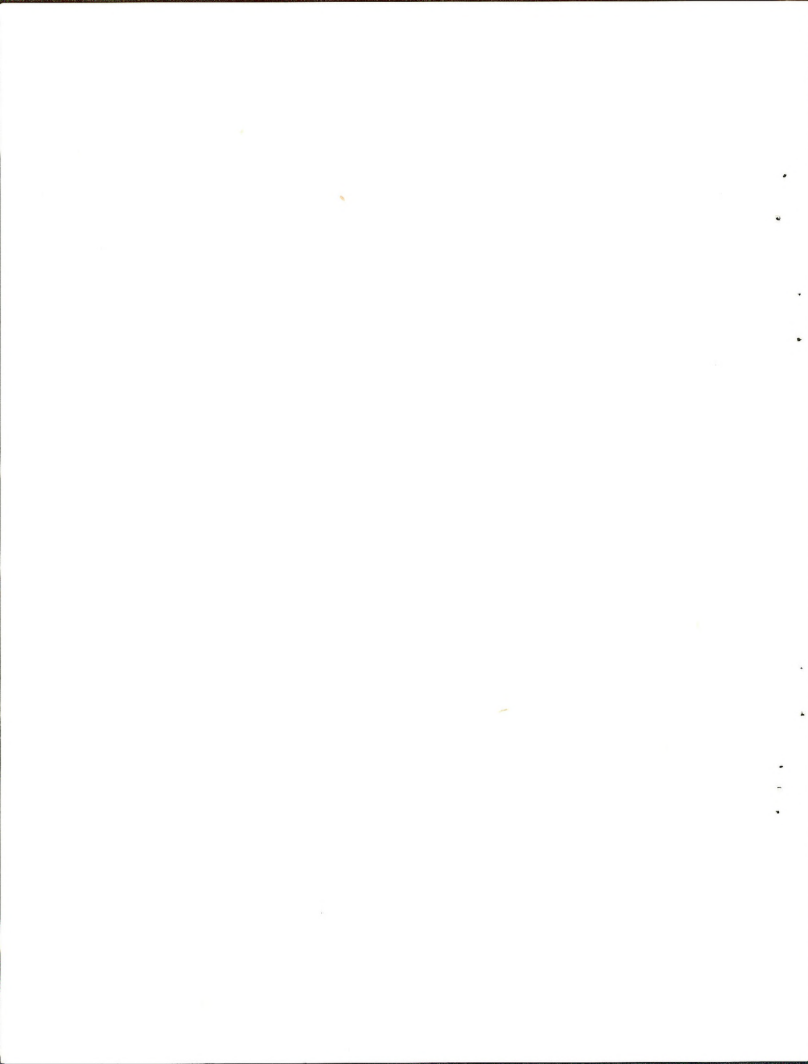
Code	Scientific Name	Common Name	Longevity
<u>Shrubs</u>			
Arfr	Artemesia frigida	Fringed sagewort	Perennial
Arpe	Artemesia pedatifida	Birdfoot sagewort	Perennial
Arsp	Artemesia spinescens	Bud sagewort	Perennial
Artr	Artemesia tridentata	Basin big sagebrush	Perennial
Atco	Atriplex confertifolia	Shadscale saltbush	Perennial
Atga	Atriplex gardneri	Nuttall saltbush	Perennial
Chgr	Chrysothamnus Greenei	Greene rabbitbrush	Perennial
Chvi	Chrysothamnus vicidiflorus	Douglas rabbitbrush	Perennial
Eula	Eurotia lanata	Common winterfat	Perennial
Grsp	Grayia spinosa	Spiny hopsage	Perennial
Koam	Kochia americana	Greenmolly summercypress	Perennial
Magl	Machaeranthera glabriuscula	Alkali aster	Perennial
Save	Sarcobatus vermiculatus	Black greasewood	Perennial
<u>Grass and Grass-Like Plants</u>			
Agsp	Agropyron spicatum	Bluebunch wheatgrass	Perennial
Agsm	Agropyron smithii	Western wheatgrass	Perennial
Brte	Bromus tectorum	Cheatgrass brome	Annual
Cael	Carex eleocharis	Needleleaf sedge	Perennial
Cafi	Carex filifolia	Threadleaf sedge	Perennial
Feoc	Festuca octoflora	Common sixweeksescue	Annual
Hija	Hilaria jamesii	Galleta hilaria	Perennial
Kocr	Koeleria cristata	Prairie junegrass	Perennial
Orhy	Oryzopsis hymenoides	Indian ricegrass	Perennial
Pofe	Poa fendleriana	Mutton bluegrass	Perennial
Pose	Poa secunda	Sandberg bluegrass	Perennial
SiHy	Sitanion hystrix	Bottlebrush squirreltail	Perennial
Stco	Stipa comata	Needleandthread	Perennial
<u>Forbs</u>			
Alac	Allium acuminatum	Tapertip onion	Perennial
Alde	Alyssum desertorum	Desert alyssum	Annual
Andi	Antennaria dimorpha	Low pussytoes	Perennial
Arabis spp.	Arabis crandellii	Crandell rockcress	Perennial
	Arabis holboellii	Holboell rockcress	Perennial
	Arabis lignifera	Woody rockcress	Perennial
	Arabis pulchra	Beauty rockcress	Perennial
Asdr	Astragalus drummondii	Drummond milkvetch	Perennial
Aspu	Astragalus purshii	Pursh milkvetch	Perennial
Atar	Atriplex argentea	Tumbling saltbush	Annual
Atwo	Atriplex wolfii	Wolf saltbush	Annual
Chat	Chenopodium atrovirens	Dark goosefoot	Annual
Chde	Chenopodium denticatum	Desert goosefoot	Annual
Copa	Collinsia parviflora	Smallflowered blueeyedmary	Annual
Cora	Cordylanthus raemosus	Bushy birdbeak	Annual



Appendix B

Plant Codes (con't)

Code	Scientific Name	Common Name	Longevity
<u>Forbs</u> (cont.)			
Crepis spp.	Crepis acuminata	Tapertip hawksbeard	Perennial
	Crepis modocensis	Yellowstone hawksbeard	Perennial
	Crepis occidentalis	Western hawksbeard	Perennial
Eren	Erigeron engelmanni	Engelmann fleabane	Perennial
Erpu	Erigeron pumilus	Low fleabane	Perennial
Erce	Eriogonum cernuum	Nodding wildbuckwheat	Annual
Ermi	Eriogonum microthecum	Slenderbush wildbuckwheat	Perennial
Erov	Eriogonum ovalifolium	Cushion wildbuckwheat	Perennial
Gipu	Gilia pumila	Dwarf gilia	Annual
Gisi	Gilia sinuata	Rosy gilia	Annual
Gypa	Gymnostris parvula	Leafless falsephlox	Annual
Haac	Haplopappus acaulis	Stemless goldenweed	Perennial
Lare	Lappula redowskii	Bluebur stickseed	Annual
Lepu	Leptodactylon pungens	Granite gilia	Perennial
Lofo	Lomatium foeniculaceum	Hairyseed lomatium	Perennial
Maca	Machaeranthera canescens	Hoary tansyaster	Perennial
Oean	Oenothera andina	Andean sundrops	Annual
Oeco	Oenothera contorta	Plains eveningprimrose	Annual
Oppo	Opuntia polyacantha	Plains pricklypear	Perennial
Orfa	Orebanche fasciculata	Purple broomrape	Perennial
Pefr	Penstemon fremontii	Fremont penstemon	Perennial
Phho	Phlox hoodii	Hoods phlox	Perennial
Phlo	Phlox longifolia	Longleaf phlox	Perennial
Plpa	Plantage patagonica	Wooly plantain	Annual
Posa	Polygonum sawatchense	Sawatch knotweed	Annual
Saka	Salsola kali	Common russianthistle	Annual
Sili	Sisymbrium linifolium	Narrowleaf hedgemustard	Perennial
Spco	Sphaeralcea coccinea	Scarlet globemallow	Perennial
Toin	Townsendia incana	Hoary townsendia	Perennial
Trgy	Trifolium gymnocarpon	Hollyleaf clover	Perennial



Appendix C

Table 1. Percent utilization of grasses and shrubs after winter use by sheep during 1968-69. The figures are average utilization values for sampling sites obtained by estimating use within seven percentage classes and dividing by frequency of occurrence. For grasses, only use on new growth was estimated. For shrubs, utilization of the previous seasons growth was considered. Ten or more Artr and Atga bushes were examined at each site where they occurred. For other species occurrence, hence sample size, varies and only a rough index to utilization is obtained. The pastures were sampled on 2 and 3 May 1969.

Pasture	Sampling	Agsm	Orhy	Stco	Pofe	Pose	Kocr	Agsp	Sihy	Cael	Brte	Cafi	Feoc	Artr	Arsp	Arpe	Atco	Atga	Eula
	Site																		
Pasture A	C1-1	9		0		13		0											
(Grazed	C2-1	8				7	0	6	25										
1 Nov-	C3-1	5				8								5					
31 Mar)	C4-1	8				0			0					7					
	C5-1	16				20								10					
	C6-1	0				0								0					
	C7-1		0			12	27	5						9					
	Exc.I				21	11	27	11	0										
Pasture B	C1-1																		53
(Grazed	C2-1	0	0	0		0								15					
1 Nov-	C3-1	0	0			0			0										
30 Apr)	C4-1	0		0						0		0		5					
	C5-1	16	0			5	0							9	5				
	C6-1	6	0			0				0				8					
	C7-1	0	0			5			0							0			
	C8-1	5				0													
	C9-1	5	0	0		0								5					
	C10-1	0	0			0	0	0	0					15					
	Exc.I	0	0			5			0					5					64
Pasture C	C1-1	6	15						5					8					
(Grazed	C2-1	27	20						5					27			9	67	
1 Nov-	C3-1	16	19	37		0				0	0			15					
30 Apr)	C4-1	0		7		0			0		0			31			5		
	C5-1		21	27		12			0					30					
	C6-1	6	0	5		0								6					
	Exc.I	0	0	5		12			16				0	5					

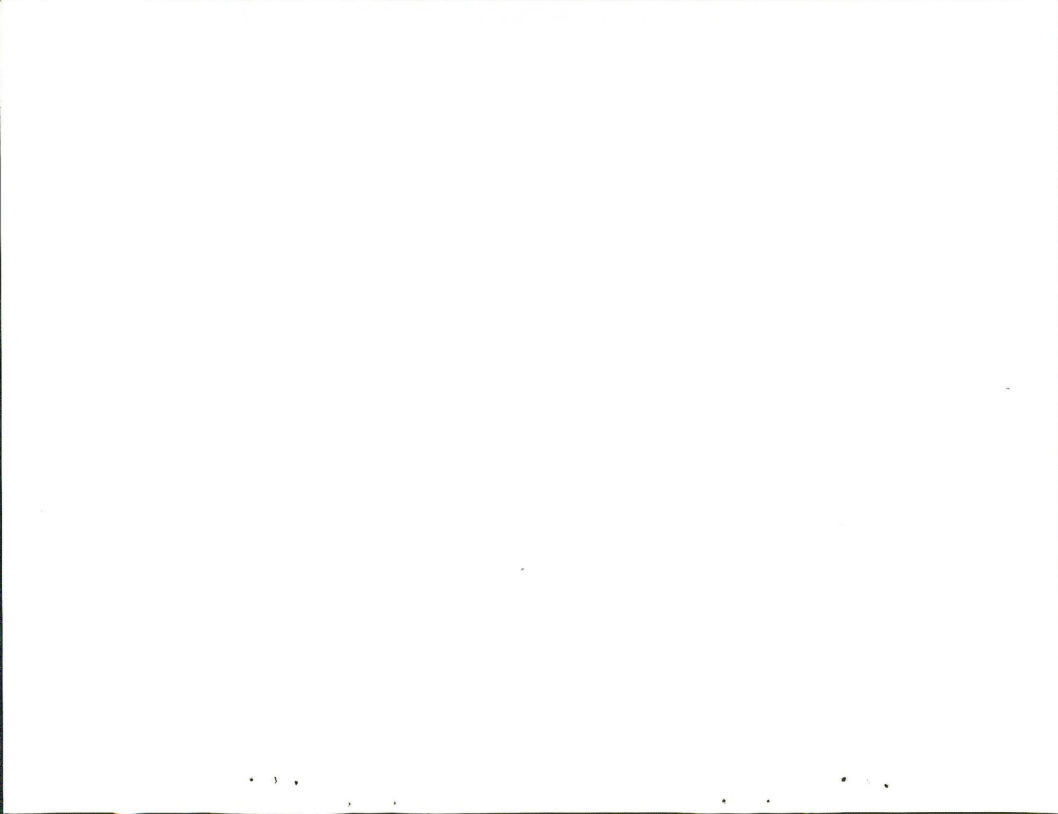


Table 1. (Continued)

Pasture	Sampling Site	Agsm	Orhy	Stco	Pofe	Pose	Kocr	Agsp	Sihy	Cael	Brte	Cafi	Feoc	Artr	Arsp	Arpe	Atco	Atga	Eula
Pasture D	C1-1	0	7			0			0					13					
(Grazed	C2-1	14	0	13		20								11					
1 Nov-	C3-1	5				5	0							10					
30 Apr)	C4-1								33					16	29		10	38	
	C5-1	0	27			10			0					6	27			59	
	C6-1	5	0			8								14					
	C8-1	22	20			5			10									34	
	C10-1	33		25		28			25		0			24			12		8

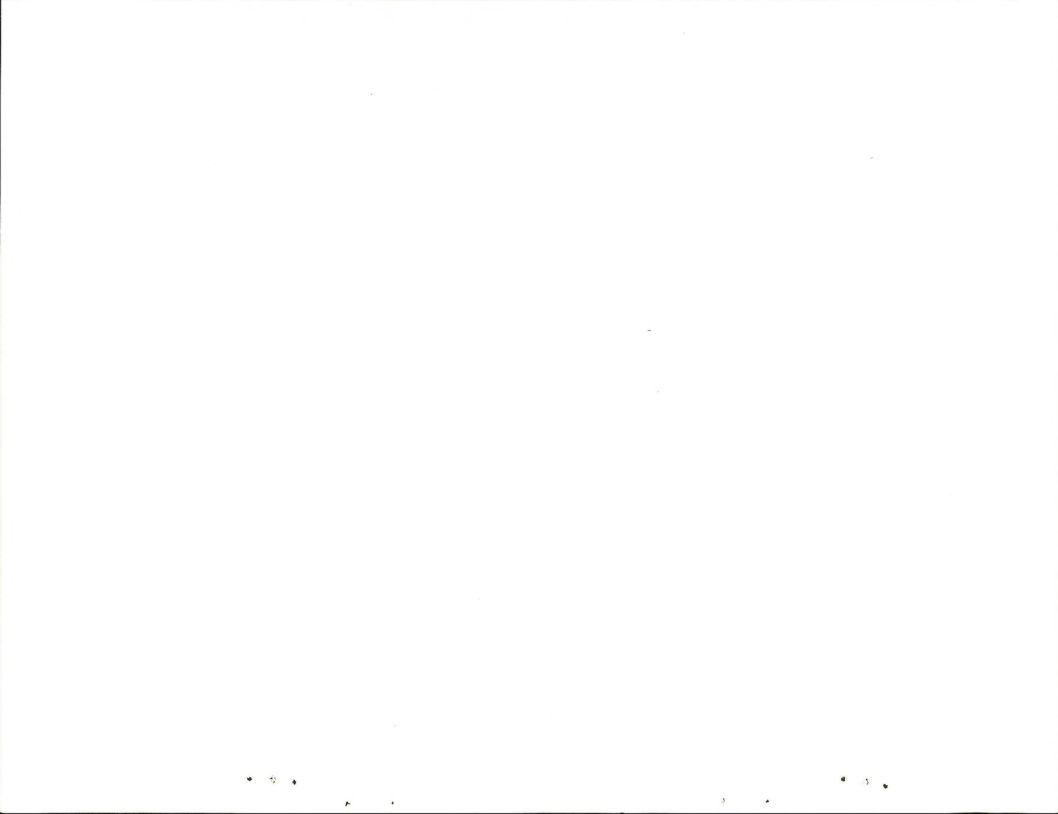


Table 2. Percent utilization of grasses and shrubs other than the key forage species (Agsm) following summer grazing by cattle during 1969. The figures are average utilization values for sampling sites obtained by estimating use within seven percentage classes and dividing by frequency of occurrence. Occurrence, hence sample size, varies for species and only a rough index to utilization is obtained. Sampling dates were as follows: Oppenhiemer West, 29 Jul; Oppenhiemer East, Pasture A and Pasture B, 23 to 31 Oct; and Poison Buttes, 29 Nov.

Pasture	Sampling Site	Orhy	Stco	Pofe	Pose	Kocr	Agsp	Sihy	Hija	Cael	Brte	Cafi	Artr	Arsp	Atga	Atco	Arpe	Save
Poison Buttes	C1-1	50	40		0			0		13			0					
(Grazed	C2-1		49		5			0	0			15	0					
15 Apr-	C3-1		61		0			0		22			0					
15 Nov)	C4-1		80		5			8					0			0		
	C5-1	43			0			0					0		15	0		
	C6-1		0		0			0					0					
	C7-1		90		6													
	C8-1		0	70	0			5										
	C9-1		48		5								0					
	C10-1	60	33		5			13					0					
	Exc.I		70	70	5			15										
Oppenhiemer	C1-1		48		5	70		27		75	0		0					
East	C2-1		37		5			0			0		0				0	
(Grazed	C3-1	80			5			7			0		0				0	
15 Jul-	C4-1		90		5			0					0		0			20
30 Sep)	C5-1		80		0			0					0					
	C6-1	0			5			20					0					
	C7-1	25		0	0			0					0				0	
	Exc.I		30		5					18			0					
Oppenhiemer	C1-1	25			0													
West	C2-1	62	38		0			20		53			0					
(Grazed	C3-1	29	41		0			33			0		0					
1 May-	C4-1	25	15		0								0				0	
15 Jul)	C5-1	80	33		0			28		25								
	C6-1	23			0			0					0	0	0			
	C7-1	42	27		0			0					0					
	Exc.I	43			0	0		0		37	0		0					

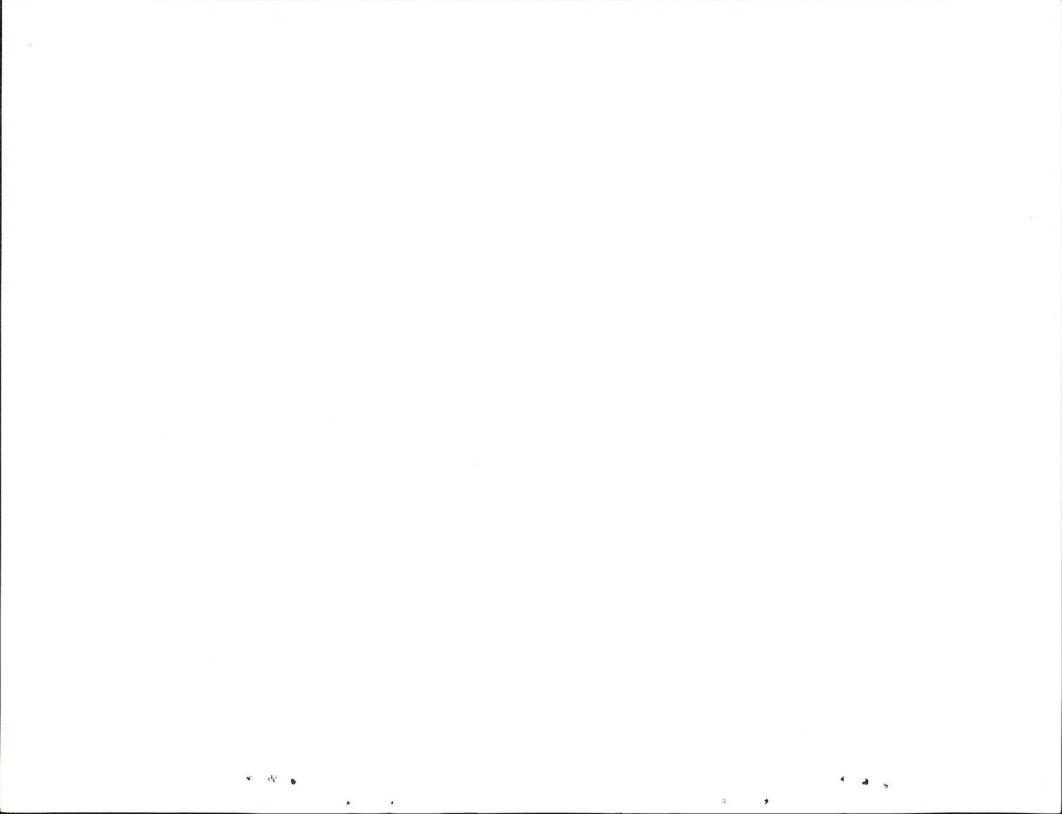


Table 2. (Cont.)

Pasture	Sampling Site	Orhy	Stco	Pofe	Pose	Kocr	Agsp	Sihy	Hija	Cael	Brte	Cafi	Artr	Arsp	Atga	Atco	Arpe	Save
Pasture A	C1-1		44	28	0	70	29											
(Grazed	C2-1		9		0		46	50										
1 May-	C3-1		80		0								0					
31 Oct)	C4-1	0	0		7								0					
	C5-1	50	70		0								0					
	C6-1	8	45		0			0					0					
	C7-1	20			0	18	16						0					
	Exc.I		59	49	5	44	30					8	0					
Pasture B	C1-1	87						70							12			
(Grazed	C2-1	15	40									8	0					
15 Jul-	C3-1	11	35		0			0				0	0					
31 Oct)	C4-1	70	26						11	0		9	0				0	
	C5-1	0			0	30	9	0		8			0					
	C6-1	42			0								0					
	C7-1	20			0			5							5		0	
	C8-1	48			5			35					0		11			
	C9-1	30	18		0			0					0			0		
	C10-1	5			0	5							0					
	Exc.I	22			0			5					0	0	6			

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